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This issue is one of 4 *Bulletins* issued during the year by Consumers' Research which are not confidential. This *Bulletin* may be freely discussed with friends. We hope that you will use the opportunity to show them what CR is doing for consumers. The *General Bulletin* is available not only to individuals, but to libraries, schools, and other groups, at $1 for the subscription year October through June. The next non-confidential issue will be the October 1938, number. ¶Responsibility for all specific statements of fact or opinion at any time made by Consumers' Research lies wholly with the technical director and staff of the organization. ¶Please send notice of any change of address at least two weeks before it is to take effect, accompanying your notice with statement of your previous address. Duplicate copies cannot be sent to replace those undelivered through subscriber's failure to send advance notice, except at the regular price for orders of such material as back issues. N.B.—For a detailed account of CR's early history, policies, and information as to the answering of special inquiries about commodities, subscribers are urged to read the *Introduction to Consumers' Research* which is sent to anyone without charge.

Symbols used to indicate sources of data and bases of ratings:
A—recommended on basis of quality.
AA—regarded as worthy of highest recommendation.
B—intermediate with respect to quality.
C—not recommended on basis of quality.
cr—information from Consumers' Research's own tests or investigations.
1, 2, 3—relative prices, 1 being low, 3 high.
37, 38—year in which test was made or information obtained by the staff of Consumers' Research.

Off the Editor's Chest

NEW POWER to protect consumers against misleading advertising was given to the Federal Trade Commission by the Wheeler-Lea Act (amending the original F.T.C. Act of 1914) which became a law sixty days after it was signed by the President, March 21, 1938. Under the original act the Trade Commission had power to proceed against a manufacturer for making misleading claims *if* those claims could be shown to injure competitors. The new amendment now makes it possible for the Commission to take action when an advertisement is misleading in a material respect, whether it injures a competitor or not. The test now becomes one of injury to the consumer.

CR has long pointed out in its books and *Bulletins* the futility of Trade Commission action depending upon injury not to those whose rights are most seriously invaded, the users of the product and the readers of advertisements, but to other enterprisers in the same line of business. The new act is, in the words of Representative Clarence F. Lea, its sponsor in the House, "intended to protect the consumer of food and drugs and cosmetics rather than to search for the criminal intent. The definition [of misleading advertising] is broad enough, however, to include all criminal misrepresentation that may be made as an inducement for the purchase of such articles."

It should be noted that the Federal Trade Commission is able to deal only with products moving in interstate commerce. Products manufactured and sold locally are not, of course, brought under the jurisdiction of the Commission; such, for example, as wave-set mixed and applied by a local beauty shop, or jams and jellies manufactured and sold wholly within one particular state.

The advertising provisions of the Wheeler-Lea Act were taken from the Copeland food, drugs, and cosmetic act, S.5, which is so snarled in politics in Congress that it seems unlikely to pass this session. In no sense is the Wheeler-Lea Act to be considered a substitute for an improved food and drugs act. Consumers will best serve their own interest by continuing their efforts to secure passage *in their respective* state *legislatures* of legislation to give adequate protection on foods, drugs, and cosmetics.

In the meantime, however, be sure to report to the Federal Trade Commission advertising which you believe to be misleading, whether it be over the radio, in newspapers, magazines, on billboards, or in circular letters. The radio perhaps particularly deserves consumers' attention in this way because of the greater degree of unscrupulousness which is used in the writing of radio advertising claims. In making such complaints be sure to include an accurate copy of the claims in question. Address the Federal Trade Commission, Washington, D.C., and, if convenient, send a copy of the letter to Consumers' Research.

A law on the statute books is poor protection unless adequately enforced. Aroused consumer interest and diligence in reporting anti consumer advertising will be the most effective means of keeping public officials alive to the needs of consumers and alert in their protection.

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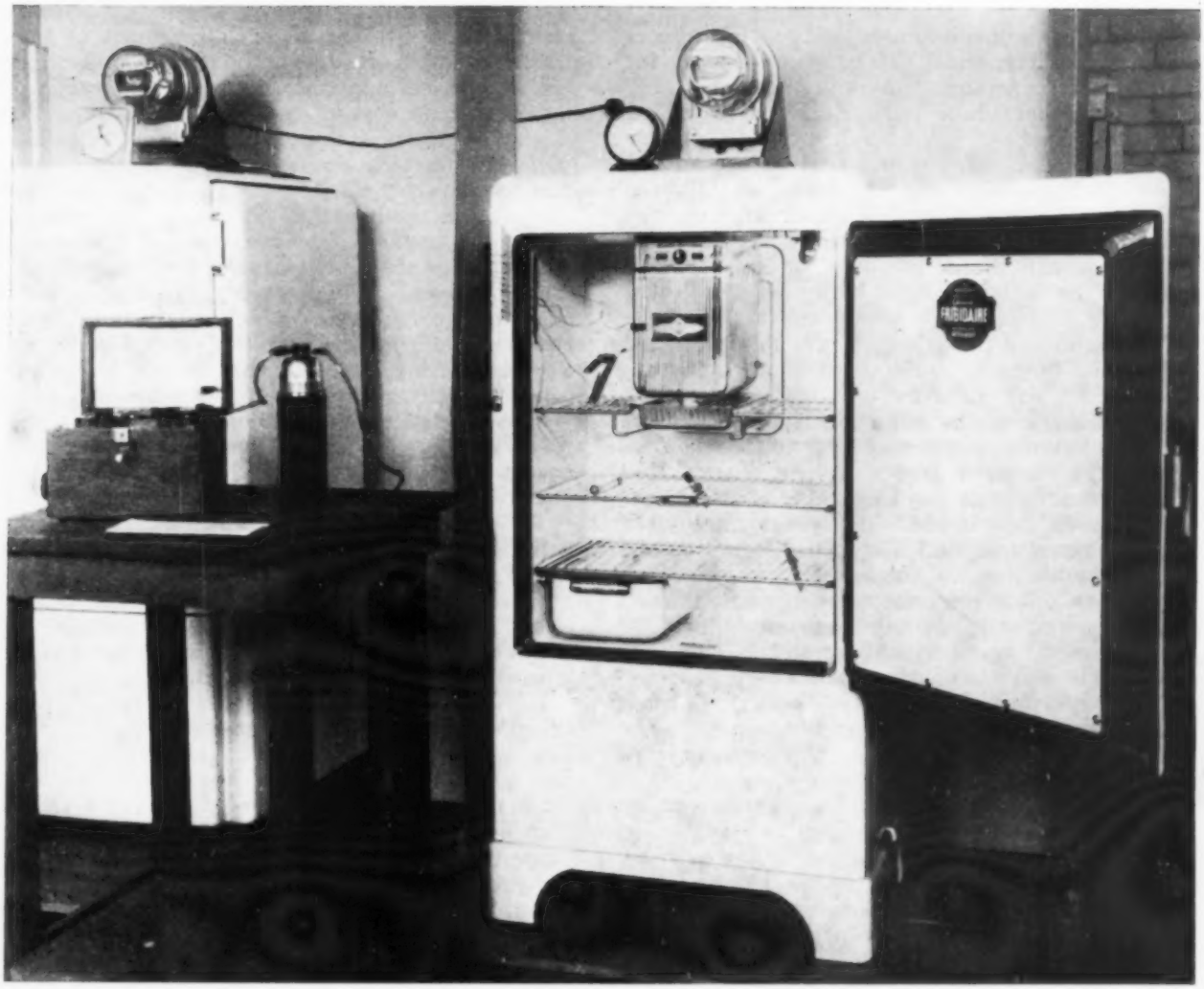
MECHANICAL REFRIGERATORS



Two refrigerators in CR's test. Also the electric clocks, kilowatt-hour meters, and thermocouples with potentiometer, which were used for measuring operating time, energy consumption, and temperatures of refrigerators.

IF SALES ORGANIZATIONS of refrigerator companies had made as much progress in serving consumers as engineers of refrigerator companies have made, there would now be much cause for rejoicing among buyers of refrigerators. By notably improving cabinets and refrigerating mechanisms, engineers have lowered the cost for the electric current required to operate a household refrigerator to a half or a third of what it was ten years ago. But sales organizations of refrigerator companies have not been infected by the same spirit of progress, for even in these times, they do very little to give satisfaction to the consumer who has bought a "lemon" or whose refrigerator requires servicing or overhauling. A sales organization may spend fifty dollars' worth of time and letter writing referring a complaining customer to this department and that—and back again—sometimes, it seems, in the hope that he may get tired of the delay and evasion and finally drop the matter. At any rate, letters which our subscribers have sent us, in their files of correspondence with refrigerator manufacturers, plainly show that in many, if not most, cases the consumer is left expensively out of pocket and thoroughly dissatisfied. So far as repairs and servicing of electric refrigerators are concerned, even by the most reputable makers, the policy of *caveat emptor* seems to be carrying on securely, and is only negligibly altered by the reforming and ennobling of business practices which have supposedly occurred in the last decade or two. (CR will welcome reports from subscribers who have had favorable experiences with refrigerator sales companies, as from those who have had unpleasant experiences; if any company is outstandingly fair and considerate in its servicing and adjustment practices, we should be

more than glad to call its dealers' and representatives' habits and behavior to the attention of our subscribers.)

The greatest immediate need and greatest opportunity in the household refrigerating field is for improvement by manufacturers in their treatment given consumers whose refrigerators have turned out to be "lemons." A liberal, prompt, and low cost replacement policy would work to the advantage of both manufacturer and consumer. To the manufacturer the problem is a minor one since the first cost of new units and parts is very small—perhaps one-fifth of the list price, or less. To the consumer the outlay required to get his refrigerator into shape may be almost a financial catastrophe.

The methods of the salesman which are aligned against the buyer of a refrigerator are often unscrupulous. *Air Conditioning and Refrigeration News*, newspaper of the industry, frequently gives equivocal hints to salesmen on how to fool the consumer. If a customer says that she can get a $162 list price refrigerator for $139, the salesman, according to an item in the *News*, should find out if it has an open unit, and if so, should play up the value and advantages of the sealed-type unit, which he can then sell at list price; but if it has a closed unit, the salesman is advised, on the other hand, to play up the value and advantages of the open-type unit. "They say that selling is an art," said the counselor who offered this advice, "but I don't think it is, I think it's just good common sense." The reader, however, if a consumer, will be inclined to call such selling by a less flattering name.

One super-salesman who sold the greatest number of one make of refrigerator one year in Kansas City has told the readers of *Air Conditioning and Refrigeration News* how to obtain prospects. One practice, as reported, has been to insert a classified ad in the newspaper, such as: "Want responsible party to pay off balance due on 1936, 8 cu ft. refrigerator. Free equity. Call MO 3-6295." While the person who answers the advertisement assumes, of course, that it is by a private party, actually the telephone number given is that of a professional answering service which provides the salesman with the names and addresses of those who phone. This super-salesman also has seen fit to advertise a refrigerator for either rent or purchase at 10 cents a day. To prospects who respond, however, Mr. Super-Salesman "explains that the offer is made on a basis of $21 cash payment, $3.50 a month for four months' service, and $3.50 drayage each way." He then, according to the trade journal's discussion of "Specialty Selling," persuades the prospect that it would be foolish to rent a refrigerator when it can be purchased on such "liberal" terms as he can offer, and he obtains, in the majority of cases, an order for a new refrigerator.

The consumer may well wonder why there are not at least a few of the larger concerns in this great and prosperous industry to resent and protest the sales tricks and fakery which trade journals so often emphasize to their readers as ways to fool customers and get more business. Judged by the amount of such chicane which finds its expression almost weekly in journals of the electric appliance trade, it would appear that the moral standards of the selling enterprise are low, and rather universally so, else many dealers of force and influence would quickly see to it that all encouragement of these practices ceased. Editors of the popular sales organs of the electrical appliance industry will react with notable promptness to any well-expressed protest of leading factors in the industry—especially if it is made evident that any substantial group believes that the industry should use only clean and honorable sales methods.

The illustrations we have cited of refrigerator sales methods are merely samples of the many which could be given. The consumer will conclude that much of the "progress" which sales organizations have made during the past ten years has been in ways of fleecing him, and that service to the consumer has either stood still or retrogressed.

Subscribers have asked about the relative cost of operation of electric and gas refrigerators. The answer as to which is the cheaper will differ for different localities because it depends upon the rates charged for both electricity and gas. The answer will depend, moreover, upon the refrigerators, for some refrigerators are much more efficient than others. In most localities, nevertheless, a good electric refrigerator will cost less to operate than will a gas refrigerator and only where the gas rate is very low will the reverse be true.

In New York, the Consolidated Edison Company, in order to increase gas consumption, has lately been trying to boost the sale of gas refrigerators and the Electric Refrigeration Association, to make more money for its members, has been trying to increase sales of electric refrigerators by claiming 30 percent lower operating costs for them than for "any other kind." At the average rates for gas and electricity in New York City, this claim, on the basis of CR's tests, is conservative even for some of the electric refrigerators which are less efficient than the best; the savings in some cases might amount to 60 or 70 percent.

One who wishes to compute more precisely the comparative costs for his own particular circumstances can do so readily from the data given in the table in this report. It must, of course, be remembered that operating costs will vary in different homes depending upon how the refrigerator is used. For instance, as CR has pointed out in a previous report, keeping the inside temperature at 40°F instead of at 44°F (a more reasonable figure), may increase the cost of operation as much as 35 percent. Operating cost also depends upon the amount of ice made—ten to twenty pounds of ice consuming about 5 cents' worth of electricity. In the table given, the first figure for monthly cost is the experimentally determined cost for operating the refrigerator without opening its door, in a room maintained at the constant temperature of 70°F; the second figure is the cost for a month when the room temperature is raised to 80°F, and the third figure is the cost for a month when the room temperature is raised to 90°F. The temperature in the refrigerator was 38°F at 70°F room temperature and rose to 43°F at 90°F room temperature. (This method of giving costs is somewhat different from

the method used in earlier reports and hence it will not be possible to make a strictly valid comparison between these figures and those in preceding years; the computation of refrigerator operating cost is a fairly complex matter and requires the making of certain reasonable assumptions.) It has been learned by experience that the cost of operating a refrigerator loaded with food in a home and used under average conditions will often be close to the figures in the second column and usually will not exceed the figures in the third column, as shown in Table 1 (assuming 5 cents per kilowatt-hour for electric current). Refrigerators were 5 cu ft models with the exception of *Kelvinator* which was a 6 cu ft model.

TABLE 1

A comparison of refrigerator operating costs per month for electricity at 5 cents per kilowatt-hour at 70, 80, and 90°F.

	Room Temperature in Degrees Fahrenheit		
	70°	80°	90°
Frigidaire Special 5-38	$ .65	$ .90	$1.20
General Electric JB5-38	.70	1.05	1.45
Westinghouse HS-52	.85	1.10	1.35
Norge S-52-8	.90	1.35	1.75
Kelvinator KS6-38	1.00	1.40	1.75
Williams Ice-O-Matic DA-38-51	1.25	1.85	2.45
Electrolux Gas Refrigerator J-500-A (at 6.82c per therm, a common rate, equivalent to a natural gas of 1100 Btu per cu ft at 75c per 1000 cu ft)	1.10	1.20	1.30
(at 23.2c per therm, a common rate for city gas [manufactured, not natural] equivalent to a manufactured gas of 540 Btu per cu ft at $1.25 per 1000 cu ft)	3.70	4.05	4.40

(One therm is 100,000 British Thermal Units. One cu ft of manufactured city gas may be expected to yield about 540 Btu, and one cu ft of natural city gas may likely yield about 1100 Btu.)

Other questions which subscribers have sometimes asked are: (1) Is it economical to stop the refrigerator during the winter months, or will it deteriorate so fast when not operating that the damage done to the refrigerator by being shut down will more than offset the saving in electricity costs? (2) Is it economical to use one of the defrosting clocks which are advertised to reduce current consumption?

The greatest probable saving in energy cost per month in shutting off any of the refrigerators listed here can be read in Table 1. Against this possible saving, the best evidence at present available indicates that there may be some leakage of refrigerant (with units which are not sealed), which leakage would not occur if the mechanism operated continuously; with sealed units, however, leaking or any other damage would be much less likely. With sealed units, therefore, there would surely be some saving by not running the refrigerator during the winter or whenever it is not needed; with open units, however, it is at least questionable whether there would be an actual long-run saving.

On the question of the economy of defrosting clocks, it is certain that advertising claims of 25 percent savings are grossly exaggerated and that there would be little if any actual saving beyond that accomplished by the simple effect of raising the average temperature inside the refrigerator, which the clock does bring about. There is no need for a clock to turn the refrigerator off, to accomplish this; merely raising the temperature control could do this and at much less cost—*if* a higher average inside temperature is actually wanted.

The technical improvement in refrigerators has been so great and so uniform among the different brands of refrigerators, that in the two years '36-'37 CR found no refrigerator of the brands tested which was poor enough to merit a *C* rating, although there was of course considerable difference between refrigerators given an *A* rating in 1936 and 1937 and those which were given a *B* rating in those years. Improvement by the manufacturers has continued but has not been universal, and this year one of the brands was found to be considerably inferior as compared with the other 1938 refrigerators tested. Its performance would have been satisfactory in CR's 1931 test, at which time, judged on energy consumption primarily, this refrigerator would easily have fallen in the *A* group. In 1938, however, its rate of energy consumption of 1.64 kilowatt-hours per day in a room at 90°F is judged to be far out of line with the performance which a good modern refrigerator should give (it should be noted that it is necessary gradually to change standards of performance as technical improvements are developed). This relatively uneconomical refrigerator used twice as much electricity as did the most efficient 1938 refrigerator, *Frigidaire* Special 5-38. Yet the advertising of the *Ice-O-Matic*, claiming "less operating cost" and "lower running costs," is directly contrary to the performance of the refrigerator tested.

Those few readers who are familiar with the examples of ignorance and exaggeration that frequently pervade the work of advertising copywriters, in general, will not be surprised to learn that claims of lower costs in use may be found associated with products of exceptionally poor performance. It is perhaps wise to repeat for the sake of the reader who has not read CR *Bulletins* over a long period,

that when it comes to various kinds of goods where performance can be tested and measured, it is fairly safe to assume that claims of the advertiser in respect to them may often be shown to be so much hokum—mere verbiage, sometimes wholly unrelated to the facts of the situation.

As previously, CR has omitted from the test some refrigerators which have been reported on in earlier *Bulletins* in order to test other brands which would also be of interest to many of our subscribers.

Also as before, CR has chosen for test, in general, refrigerators among the "economy" lower-priced models, lacking a few gadgets but differing in no essential way from the more expensive "standard models." The consumer in some localities will experience some difficulty in locating an economy model, for much of the advertising literature fails to show them, and salesmen, of course, often try to sell as expensive a model as they can and will often exert themselves to keep all knowledge of the existence of a cheaper model from their customers. The refrigerators were bought and tested by CR, with the exception of the *Kelvinator*. Nash-Kelvinator Corporation, in accordance with the conditions which are set down in the *Introduction to Consumers' Research*, Section 23, arranged to have one of their refrigerators selected and tested by a well-known commercial testing laboratory, which has in the past conducted some of CR's own refrigerator tests and is known to CR to be fully competent in this field and entirely trustworthy. Expenses of the *Kelvinator* tests and of furnishing the machine, which remained Kelvinator's property, were borne by Nash-Kelvinator Corporation; the tests were carried out at Kelvinator's own instance; the laboratory findings were directly supplied to CR, in full.

The refrigerators in this report were tested according to the standard procedure described in *Household Electric Refrigerator Standards* of the National Electrical Manufacturers Association, published March 1937, and were, besides, tested for safety of electrical insulation. In addition, with the exception of *Kelvinator*, they were subjected to an endurance test run under severe conditions of temperature and relative humidity, and to tests for comparative noise of operation, and for resistance of the interior porcelain enamel to food acids. Efficiency was well maintained by the refrigerators during the endurance test. Refrigerating capacity (cold-maintaining ability under severe conditions) was adequate in all cases. There was no staining of the porcelain enamel except as noted in the listings which follow. Thermostatic control was judged satisfactory in all cases. Shelves were tinned. (A much needed improvement is more durable shelves—ones which will not rust after a few years of service as will those which are tinned. This improvement would add but little to the cost of manufacture but would add greatly to the length of fully satisfactory service given by the refrigerator.) Hazards of various refrigerants have been discussed by CR in an earlier (May 1934) *Bulletin*; that discussion is still up to date. Prices of electric refrigerators vary to some extent with the local competitive marketing situation and may, in some cases, differ somewhat from those given here. All ratings are cr 38.

A. Recommended

Frigidaire Special 5-38 (Frigidaire Corp., Dayton, Ohio) $167. 5.1 cu ft capacity, 10.2 sq ft shelf area (0.7 sq ft less than advertised). Sealed compressor, rotary type. Lowest in cost of operation of electric refrigerators tested. Quiet in operation except for a hum when starting up. Refrigerant was dichlorotetrafluoroethane. ¶The next higher-priced model, *Frigidaire Master 5-38*, $187, had same storage space, shelf area, and mechanism as model tested. It had four ice trays instead of three, froze eight pounds of ice instead of six, and had two fancy sliding "hydrators" instead of one.

General Electric JB5-38 (General Electric Co., Cleveland) $179.50. 5.2 cu ft capacity, 10.8 sq ft shelf area. Sealed compressor, reciprocating type. Second lowest in cost of operation of electric refrigerators tested. (Details of cost for varying conditions are given in preceding table.) Quiet in operation. Refrigerant was sulphur dioxide. ¶The next higher-priced model, *General Electric B5-38*, $194, had same storage space, shelf area, and mechanism as the model tested. It had three ice trays instead of two (although advertising literature claimed *JB5-38* had three aluminum ice trays), and two of the trays had quick release for ice cubes. Also had covered vegetable drawer instead of covered enameled pan.

Westinghouse HS-52 (Westinghouse Electric & Mfg. Co., Mansfield, Ohio) $167. 5.3 cu ft capacity, 9.8 sq ft shelf area. Sealed compressor, reciprocating type. Third lowest in cost of operation of electric refrigerators tested. (But see preceding table for costs under varying conditions.) Slight noise, but judged unobjectionable. Refrigerant was dichlorodifluoromethane (*Freon*). Temperature on coldest setting of control went excessively low (near to or below 0°F), so as to freeze everything in the refrigerator. ¶The next higher-priced model, *Westinghouse HDS-52*, $187.50, had same cabinet, storage space, shelf area, mechanism, and ice trays. It had a covered drip tray instead of open drip tray, and two sliding drawers (one open and one closed), instead of covered enameled pan.

B. Intermediate

Electrolux J-500-A (Servel, Inc., Evansville, Ind.) $199.50. 5.1 cu ft capacity, 11.0 sq ft shelf area (0.5 sq ft larger than advertised). Absorption machine driven by the heat from a gas flame. Cost of operation at 6.8c per therm (100,000 Btu) for natural city gas (a common rate for natural gas corresponding to a rate of 75c per 1000 cu ft of gas of 1100 Btu per cu ft), about one-third higher than for *Frigidaire Special 5-38* with electricity at 5c per kwh. At 23.2c per therm (a common rate for manufactured city gas corresponding to $1.25 per thousand cu ft of 540 Btu per cu ft gas), cost of operation about four times that for *Frigidaire Special 5-38*. With propane (bottled gas) at $12 per hundred pounds, the cost may reach eight or ten times that for *Frigidaire Special 5-38*.[1] Quiet in operation. Absence

[1] Price of any gas, in order for this refrigerator to be as economical in operation as the *Frigidaire Special 5-38* with electricity at 5c per kwh, should be approximately 5.1c per therm, which is equivalent to *manufactured* city gas at *28c per 1000 cu ft* and *natural* city gas at *56c per 1000 cu ft* (both approximate).

B. Intermediate (contd.)

of moving parts is not proof that refrigerator will need no servicing. On the contrary, burners have needed occasional cleaning and adjustment. Refrigerant was ammonia and methyl chloride. ¶The next higher-priced model, *Electrolux J500*, $229.50, had same mechanism, storage space, and shelf area; cabinet was higher, due to use of higher legs. It had door on evaporator and better ice trays with quick release for cubes. Also had two vegetable drawers instead of covered enameled bin.

Kelvinator KS6-38 (Nash-Kelvinator Corp., Detroit) $182.95. 6.1 cu ft capacity, shelf area 14.0 sq ft. Sealed compressor, reciprocating type. Cost of operation about 50% higher than for *Frigidaire Special 5-38*, a 5 cu ft model. Refrigerant was dichlorodifluoromethane (*Freon*).

Norge S-52-8 (Norge Corp., Detroit) $169.95. 5.1 cu ft capacity, 11.8 sq ft shelf area. Open compressor, rotary type. Cost of operation about 50% higher than for *Frigidaire Special 5-38*. Slight noise, but judged unobjectionable. Refrigerant was sulphur dioxide. ¶The next higher-priced model, *Norge R51-8*, $189.95, had the same mechanism and number and kind of ice trays, and space and shelf area were claimed to be practically the same. It had two sliding vegetable drawers instead of one covered enameled bin, one sliding open basket, and a sliding tray.

C. Not Recommended

Williams Ice-O-Matic DA-38-51 (Williams Oil-O-Matic Heating Corp., Bloomington, Ill.) $167. ($129 in N.Y.C.) 5.4 cu ft capacity, 11.3 sq ft shelf area. Open compressor, reciprocating type. Lacked ice tray release. Cost of operation about twice that of *Frigidaire Special 5-38*. Quiet in operation at first; slight noise developed as test proceeded, but judged unobjectionable. There was a slight dulling of the gloss of the interior porcelain enamel by acetic acid (vinegar). Electrical connections to motor's starting condenser were defective when refrigerator was received. Refrigerant was methyl chloride. **No higher-priced model in the 5 cu ft size.**

TENNIS AND GYMNASIUM SHOES

ATHLETIC SHOES are one of those articles for which one can pay much, but get very little in the way of the essential attributes of sturdy construction using strong materials, well manufactured. The most expensive brand of such articles is more likely than not to afford the least in actual wear life per dollar, and a higher-than-average price is all too often no safeguard at all against poorer-than-average quality.

As CR has pointed out previously, the athletic shoe is more susceptible to failure from wear of the upper, or breaks at the toe or along the line of the top of the sole at the counter, than from wearing out of the sole. In the present test, especial attention has been given to the constructional features which should determine the durability of the shoe in these respects. Abrasion resistance of the rubber compound of the sole was, as usual, the basis for determination of its wear life per dollar. This figure of merit, as derived from the abrasive index of the rubber compound and the thickness of the sole, was found to have for the best shoes four times the value it had for the poorest. The actual abrasion resistance, per unit thickness, of the rubber compound, however, differed only in the range of 2 to 1. This shows a clear lack of relationship between the quality and thickness of the sole, and shows that one cannot trust a shoe which has an apparently generous thickness of rubber on the sole, to be necessarily a long-lasting shoe. A study of the listings will make it clear, moreover, that the price set by the manufacturer for the shoe shows no reflection of the value actually delivered to the consumer.

One of the ways in which the shoes were found to differ considerably was in the strength of the rubber strip, called the foxing strip, covering the crevice formed by the junction of upper and sole. The strength of this strip would be closely related to possible failure at this point, since a break in it would increase the liability to separation of the parts. Some of the shoes were easily torn by hand along this vulnerable point, others were definitely harder to tear, and some could not be torn at all.

In CR's previous test, five of the twelve pairs of shoes tested had sponge rubber insoles; in the present test of sixteen shoes, eight had sponge rubber insoles, two had sponge rubber under the heel and arch, and one had a gum rubber cushion insole formed of parallel tubes, thus showing the tendency toward increased use of some kind of cushioning.

Six of the shoes had the crepe rubber soles, seven had white rubber soles (five of which were women's shoes) and three had ordinary or "live" rubber soles of different colors. True crepe soles have a translucent appearance, while "crepe style" soles are definitely opaque. The latter, though made of molded rubber, are very serviceable, but one should not pay the higher crepe sole prices for them. Many of the true crepe soles are smooth-surfaced, whereas the "crepe style" soles are always irregularly ridged to conform to the popular conception of crepe rubber as rough or wrinkly.

The "white rubber" most commonly found in

women's tennis shoes is usually very highly compounded with substances to increase volume and weight. Although referred to as "white rubber," it may be colored. It is impossible to distinguish this low grade of compounded rubber from a good grade of sole-rubber by inspection. "Live" rubber soles, which are the better type and less heavily compounded, are molded, and are usually found on gymnasium and other "heavy duty" shoes. They are more elastic than the "white rubber," and are found in many colors.

Women's tennis shoes and gymnasium shoes are much alike in construction, the chief difference being that tennis shoes are usually oxfords (low uppers), while gymnasium shoes usually have high uppers. Men's tennis shoes are usually oxfords, and of different construction from men's gymnasium shoes.

Owing to the large influence of constructional features on the possibility of failure, in shoes which are subjected to such unpredictable strains and conditions of wear as athletic shoes are, the brands tested were not ranked strictly in order of their merit on a sole-wear per dollar basis, as has been CR's practice in some cases. The indicated sole-wear per dollar was, however, given the principal weight in determining the rankings, with modifications according to the shortcomings of construction found. The strength of the fabric of the uppers and counters is indicated by the density of the weave (high thread counts), and thickness. These factors were taken into account in evaluating the quality of construction. All ratings are cr 38.

MEN'S GYMNASIUM SHOES

A. Recommended

Keds Speedarch No. MK 238 (U. S. Rubber Products Inc., 1790 B'way, N.Y.C.) $2.19. White rubber sole. Sponge rubber insole with arch cushion. Weight, medium. Sole-wear per dollar less than for *Malay*. Construction was very strong along joint of sole and upper.

Malay (Hood Rubber Co., Inc., Watertown, Mass.) $1.65. Sponge rubber insole with arch cushion. Weight, lightest of the men's gymnasium shoes. Sole-wear per dollar, very good. Construction was strong along joint of sole and upper.

B. Intermediate

Skips, Cat. No. 26—4956 (Distrib. Montgomery Ward & Co.) $1.19 plus postage. White rubber sole. Sponge rubber insole with arch cushion. Weight, heaviest of the men's gymnasium shoes. Sole-wear per dollar, very good. Constructional details were such that shoe was easily torn along joint of sole and upper.

C. Not Recommended

J. C. Higgins, Cat. No. 6—1318 (Sold by Sears, Roebuck & Co.) $2.98 plus postage. Had fabric faced insole, which is considered undesirable. Weight, somewhat above average. Sole-wear per dollar, lowest of the group. Was easily torn along joint of sole and upper.

MEN'S TENNIS SHOES

A. Recommended

Converse, Chuck Taylor Model, No. 9410 (Converse Rubber Co., Malden, Mass.) $1.29. Crepe sole. Insole, of special rubber, cushioned by hollow parallel tubes. Weight, above average for the group. Sole-wear per dollar, best of the group. Resistance to abrasion of sole rubber compound highest, by a considerable margin, of all shoes tested. Upper and counter-facing (lining of the upper around the heel) of good construction. Construction was very strong along joint of sole and upper.

B. Intermediate

J. C. Higgins Conference, Cat. No. 6—1335 (Sold by Sears, Roebuck & Co.) $1.35 plus postage. Crepe sole. Heavy sponge rubber under heel and arch. Weight, heaviest of the men's tennis shoes. Sole-wear per dollar, fair. Construction was very strong along joint of sole and upper.

Keds Rampart, No. MK 527 (U. S. Rubber Products. Inc., N.Y.C.) $1.19. Crepe sole. Sponge rubber insole. Weight, lighter than average for the group. Sole-wear per dollar, poorest of the group. Was easily torn along joint of sole and upper.

Skips, Cat. No. 26—4979 (Distrib. Montgomery Ward & Co.) 89c plus postage. Crepe sole. Sponge rubber insole. Weight, lightest of the men's tennis shoes. Sole-wear per dollar, good. Was easily torn along joint of sole and upper.

WOMEN'S ATHLETIC SHOES

A. Recommended

Amazon (La Crosse Rubber Mills Co., La Crosse, Wis.) $1.25. Oxford. Crepe sole. Rubber faced composition insole. Weight, above average for the group. Sole-wear per dollar, very good; resistance to abrasion of sole rubber compound, per unit thickness, also very high. Upper, very strong; construction was very strong along joint of sole and upper.

Sears, Cat. No. 76—9576 (Distrib. Sears, Roebuck & Co.) 79c plus postage. High upper. White rubber sole. Rubber-faced composition insole. Weight, below average for the group. Sole-wear per dollar, good. Durable counter-facing. Was easily torn along joint of sole and upper.

B. Intermediate

Converse Proshu, Chuck Taylor Model, No. L9240 (Converse Rubber Co.) $1.35. High upper. Crepe sole. Sponge rubber under heel and arch. Weight, next to heaviest of the women's athletic shoes. Sole-wear per dollar, fair. Was somewhat weak along joint of sole and upper.

Skips, Cat. No. 26—4206 (Distrib. Montgomery Ward & Co.) 59c plus postage. A gymnasium type shoe. High upper. Crepe type sole. Weight, heaviest of the women's athletic shoes. Sole-wear per dollar, best of all shoes tested (due mostly to low price). Had a cloth-faced insole (considered undesirable), a light lining, and light counter-facing. Was easily torn along joint of sole and upper.

Skips, Cat. No. 26—4231 (Distrib. Montgomery Ward & Co.) 69c plus postage. Oxford. White rubber sole. Sponge rubber insole. Weight, below average for the group. Sole-wear per dollar, only fair; much less than

B. Intermediate (contd.)

in *Skips*, Cat. No. 26—4206, but considerably stronger along joint of sole and upper. The sole was thin, and besides, rubber compound had poorest resistance to abrasion, per unit thickness, of all shoes tested. Durable counter-facing.

C. Not Recommended

Goodrich Women's Laced to Toe High Shoe (Sold by Marshall Field & Co., Chicago) $1.75. White rubber sole. Sponge rubber insole. Weight, medium. Sole-wear per dollar, poor. Thin sole. Was easily torn along joint of sole and upper.

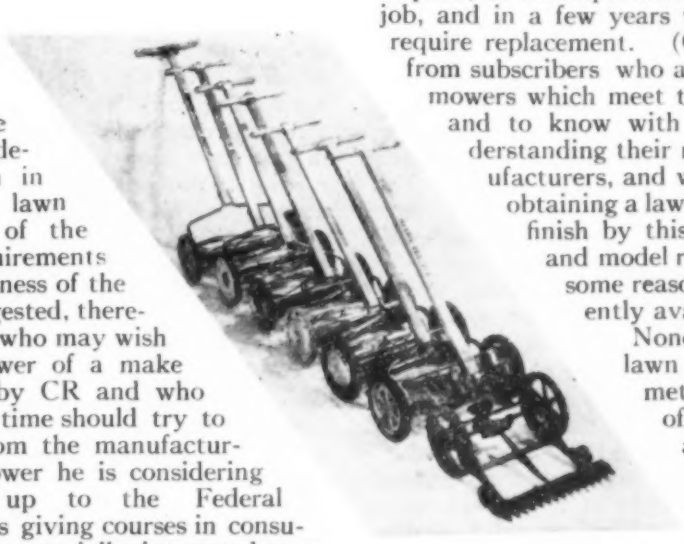
Grips Eclipse, No. WG 410 (Beacon Falls Rubber Footwear Div. of U.S. Rubber Co., 1937 Buchanan St., Passaic, N.J.) $1.19. High upper. White rubber sole. Sponge rubber insole. Weight, medium. Sole-wear per dollar, poor. Thin sole. Was easily torn along joint of sole and upper.

Sears, Cat. No. 76—9552 (Distrib. Sears, Roebuck & Co.) 67c plus postage. Oxford. White rubber sole. Rubber-faced composition insole. Weight, lightest of the women's athletic shoes. Sole-wear per dollar, only fair. Thinnest sole of all shoes tested; poor resistance to abrasion, per unit thickness. Was somewhat weak along joint of sole and upper. Construction of counter judged too light.

LAWN MOWERS

SINCE the last report on lawn mowers by Consumers' Research was issued, much progress has been made in setting down the requirements which a good lawn mower should meet. Federal Specification OO-M-671 now gives the requirements for lawn mowers which are to be purchased by the government. Many of these points are of value to the consumer as guides in comparing mowers available in his local hardware or department store.

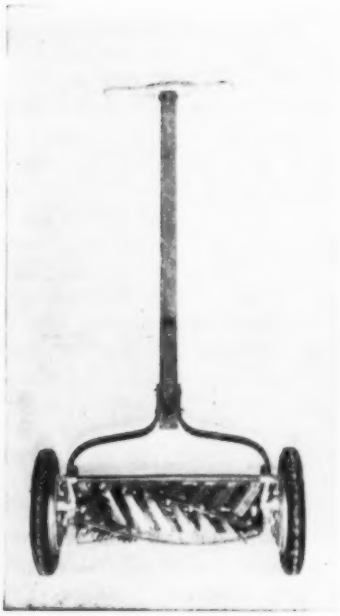
Unfortunately the consumer is unable to determine by inspection in the store whether a lawn mower meets certain of the very important requirements such as adequate hardness of the cutting parts. It is suggested, therefore, that the consumer who may wish to purchase a lawn mower of a make and grade not tested by CR and who can take the necessary time should try to ascertain in writing from the manufacturer in what ways the mower he is considering purchasing measures up to the Federal Specification. Teachers giving courses in consumers' problems will be especially interested to go over the specification in relation to the mowers used by their school and by the various students at their homes, in order to teach the importance of close observation and accurate compliance with certain fundamental constructional requirements. Copies of this specification may be obtained from the Superintendent of Documents, Washington, D.C., at five cents a copy. In the long run, a mower which fails to meet the important requirements for hardness of cutting parts and for size and quality of bearings may be expected to prove to be expensive and troublesome. A well-made lawn mower should give good service for a generation, should need occasionally to be adjusted, and should require sharpening only at rather long intervals. A poor lawn mower will call for adjustment every time or two that it is used, will be hard to push, do a comparatively ineffective and uneven job, and in a few years will work so badly as to require replacement. (CR would be glad to hear from subscribers who attempt to purchase lawn mowers which meet the Federal Specification, and to know with what courtesy and understanding their requests are met by manufacturers, and what success they have in obtaining a lawn mower of good type and finish by this method when a make and model recommended by CR is for some reason not easily or conveniently available.)



The Lawn Mowers Tested by CR

None of the conventional-type lawn mowers in CR's new test met all of the requirements of the Federal Specification and some mowers failed in very important requirements which affected seriously the serviceability of the mowers. The Federal Specification calls for a Rockwell hardness of not less than 32 for the rotating blades, and not less than 34 for the "bed knife." Of the six mowers of conventional type tested, only one mower met the specification for the blades; on the other hand, only one failed to meet the hardness specification for the bed knife. All the mowers failed by a wide margin to meet the specification of a minimum Shore scleroscope

number of 85 for hardness of the pawls, but this failure was judged to be less important than the failures to meet the blade and bed-knife specification, since the pawls in any case would probably last for a number of years and replacement should not be expensive nor difficult. Bearings of several of the mowers failed by wide margins to meet the Federal Specification for size. Except for minor failures, all mowers met the specifications of a minimum diameter of 10 inches for drive wheels, a minimum width of 1⅛ inches for rim, a minimum diameter of 6 inches for the cutter wheel, an adequate tie rod, satisfactory means for lubrication, handles of suitable strength, and proper means for adjustment of bed knife. Of the mowers tested, two, the *Arlington* and *Ohio Hi-Kut*, failed to have the requisite 4 spiders for supporting the blades; one, the *Coldwell*, failed to meet the specification of 5 blades, which is a feature tending to ensure a smoother cut; and all but one, the *Ohio Hi-Kut*, failed to meet the specification for adjustment of height of cut over a 1-inch range between ½ and 1½ inches above the ground.

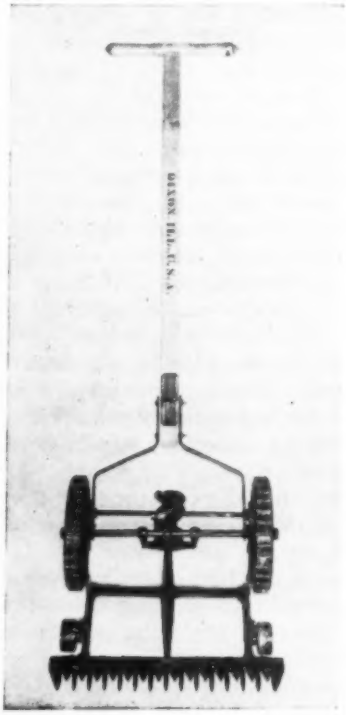


Coldwell Mokleen Chief, equipped with stamped metal weed catchers which were only partially effective.

Cutting grass too close may be injurious to the lawn and it is important to note that people do very often cut their grass too close. Except under special circumstances (for example with a lawn of creeping bent, which is common on putting greens), the grass should never be cut closer than 1 inch above the ground; 1¼ inches or higher is preferable, especially in spring. Some authorities go further and specify a minimum height of 1½ inches, with a 2-inch minimum for the first two cuttings in the spring.

There have been certain new developments in lawn mower design which have not been taken account of in the Federal Specification. One of these is the use of an aluminum or alloy frame as in the *Great American Meteor*. Aluminum has the important advantage of being lighter in weight. While it is softer than cast iron it is also less brittle. The chief drawback of the aluminum lawn mower would seem to be the use of aluminum gears; these are quiet in operation but are probably far less resistant to wear than they would be if made of iron. Another innovation is the use of rubber tires on the drive wheels. The rubber tires may be pneumatic, solid, or "semipneumatic" (with sealed air spaces). It is thought that few ordinary users of a lawn mower will wish to be bothered by keeping pneumatic tires inflated. On the other hand rubber tires of either the solid or semipneumatic type, are judged to be an improvement in that they reduce noise and serve to cushion the mower when it runs along a wall, walk, or curb. Rubber tires may merely slip on over a metal wheel which is of the usual lawn mower type or they may be held on by a rim. Other mower innovations are the use of a rubber covering on the tie rod, and a rubber covering on the roller. These are of limited value, although the covering on the tie rod may have some use in preventing damage to trees in case the mower is run into them and the covering on the roller may serve to protect the wood from dampness. It is of course important for the health of a tree not to injure seriously the cambium layer as would be done by running into it with a lawn mower; but with a very young tree damage will be done anyway, (not by striking with the tie rod, but rather by cutting with the revolving blades while the tree is bent over by the blow from the rod).

People who have considerable expanses to mow will probably prefer an eighteen- to twenty-inch lawn mower, while those who have to mow around garden beds or up and down terraces, will choose a fourteen- or sixteen-inch mower. All the mowers tested were sixteen-inch mowers, except the *Great American Meteor* which was nineteen inches. Makers' claims that their mowers are "self-sharpening" can be heavily discounted. A certain degree of self-sharpening is inherent in all lawn mowers of the ordinary type, yet all of them need occasional re-sharpening by a qualified workman. The greatest service the lawn mower manufacturers can provide is a quality of steel in blade and bed knife that will



Clipper, extremely hard to push, and, in CR's opinion, quite unsuccessful as a lawn mower.

require resharpening as infrequently as possible.

The bed knife of a lawn mower should be adjusted to give a slight wiping action without binding, over the entire length as each cutter blade revolves. After adjustment, it should be possible to shear strips of a single thickness of newspaper over the entire length of each cutter blade.

All ratings are cr 38.

B. Intermediate

The Arlington (The Eclipse Lawn Mower Co., Prophetstown, Ill.) $8.90. Weight, 39 lb. Rubber-tired wheels. Failures to meet Federal Specification judged minor except as to the deficient hardness of blades and pawls, small size of drive-wheel bearings, size of roller, and limited range of adjustment of height of cut. Judged fourth in ease and quietness of operation of 6 conventional-type lawn mowers tested. Roller turned with difficulty because of a bent roller pin. **1**

Wards Master Quality, Cat. No. P384—5530 (Distrib. Montgomery Ward & Co.) $9.95 plus postage. Weight, 44 lb. Rubber-covered tie bar, and rubber-tired wheels. Failures to meet Federal Specification judged minor except as to the deficient hardness of blades and pawls. Judged third in ease and fifth in quietness of operation of 6 conventional-type lawn mowers tested. **2**

Great American Meteor (Pennsylvania Lawn Mower Works, Primos, Del.Co., Pa.) $23.35. Weight, 38 lb. 19-in. cut. Rubber-covered roller and rubber-tired wheels, aluminum frame. The only mower tested which met specification for hardness of blades. Though it failed to meet several clauses of the Federal Specification, failures were considered minor. Judged easiest and quietest in operation of 6 conventional-type lawn mowers tested. Cast-aluminum gears judged likely not to prove as capable of standing up under hard use as cast-iron gearing. Use of aluminum for frame judged desirable for reduction of weight. Would have been rated *A* except for uncertainty of durability of aluminum wearing surfaces. **3**

C. Not Recommended

Clipper (Clipper Mfg. Co., Inc., Dixon, Ill.) $13 plus freight. Weight, 38 lb. Metal wheels without rubber tires. An unconventional type of lawn mower having two cutter knives—one fixed and one reciprocating, after the manner familiar in a farmer's mowing machine. Extremely hard to push and quite unsuccessful as a lawn mower in CR's efforts to use it. Not suited to lawn-mowing; fundamental changes in design would be required to make this type of mower suitable for mowing tall weeds and grass. CR would strongly advise that no one purchase this mower except on a basis calling for payment only after successful use. *N.B.*—No Federal Specifications are available for this type of lawn mower. **2**

Craftsman, Cat. No. 99—8243 (Distrib. Sears, Roebuck & Co.) $11.45 plus postage. Weight, 46 lb; heaviest of the lawn mowers tested. Rubber-tired wheels. Equipped with a so-called "one-shot" oiler for convenience in oiling. Failed by considerable margin to meet Federal Specification for hardness of bed knife, blades, and pawls, and for cutting action (newspaper cutting test). Judged fifth in ease and third in quietness of operation of 6 conventional-type lawn mowers tested. One pawl functioned only intermittently. Considerable tendency for grass to catch on the reel shaft and to wind up around it. **2**

C. Not Recommended (contd.)

Ohio Hi-Kut, No. 165 (The Ohio Cultivator Co., Bellevue, Ohio) $13.40. Weight, 42 lb. Metal wheels without rubber tires. Failed by considerable margin to meet Federal Specification for hardness of blades and pawls, for probable permanence of adjustment of reel-shaft bearings (races were soft), size of drive-wheel bearings, and cutting action. Judged hardest and noisiest in operation of the six conventional-type lawn mowers tested. Knife blade fastened to bed knife by rivets instead of by machine screws, which is obviously a serious disadvantage in case the bed-knife blade needs replacing. The only mower tested which met the Federal Specification for range of adjustment of height of cut. **2**

Coldwell Mokleen Chief (Coldwell Lawn Mower Co., Newburgh, N.Y.) $16.50. Weight, 45 lb. Rubber-covered roller and rubber-tired wheels. Failed by considerable margin to meet Federal Specification for hardness of blades and pawls, for size of drive-wheel bearings, wood of roller, cutting action, size of and probable permanence of adjustment of reel-shaft bearings (races were soft), range of adjustment of height of cut, and number of blades. Judged second, however, in ease and quietness of operation of 6 conventional-type lawn mowers tested. Equipped with 28 special, small, stamped metal weed catchers, which were, however, only partially effective; weed cutting performance, judged not much better than that of *Great American Meteor*. Owing to small number of blades, length of swath of grass cut per blade was too large. **3**

Protection Against Lightning

About four hundred people are killed each year by lightning in the United States and perhaps a thousand others are injured.

Persons who are interested in how to protect themselves and their property against lightning should read the new booklet of 96 pages, issued by the National Bureau of Standards, called *Code For Protection Against Lightning*. This can be obtained from the Superintendent of Documents, Washington, D.C., for 15 cents—a very good 15 cents' worth for people living in the country or in isolated or hilltop homes where lightning is a practical danger. The booklet discusses lightning—its origin, characteristics, and effects—and gives detailed instructions how to protect against it.

Teachers of elementary science who have been teaching the not uncommon textbook misconceptions about lightning should also find the booklet useful. They will learn, for instance, contrary to what certain textbooks say, that "the sole purpose of lightning rods or grounded metal roofs is to protect a building in case a stroke occurs, there being no evidence or good reason for believing that any form of protection can prevent a stroke."

GAS RANGES

ABOUT ONE-THIRD of the heat produced by surface burners of an ordinary gas stove of today is used to cook with; the other two thirds escape into the room and help to heat the house in winter, or add to the discomfort of an already hot kitchen in summer. Yet the efficiency of the stove in the use of gas could be easily increased and the gas consumption reduced by as much as a third by proper arrangement of the burners. If by proper design the amount of excess air which rushes up around the burner is reduced, so that a minimum beyond the amount actually required for combustion is used in this way, the efficiency will be increased. If the distance between burner and cooking vessel is properly adjusted, and conduction of heat to the frame of the stove is limited by insulation of the grate (which can be effected by providing an air space), the efficiency of a burner will be further increased. These three elements incorporated in a proper design will permit an increase of the efficiency of the burner from 35 percent or thereabouts to over 50 percent. With gas as expensive as it usually is, this low efficiency is something of a misfortune to the ordinary man who must pay the gas bills. The main thing about it is that the efficiency which is lacking is lost forever, that the defect is inherent and is an extra price one pays, like a tax, as long as the stove is used.

The American Gas Association will not approve as acceptable, according to their requirements effective January 1, 1938, a stove having a burner efficiency below 40 percent (measured after the burner has been in operation for a considerable period of time). This requirement has been raised from 30 percent since CR pointed out, in its last report on gas ranges, that an efficiency of 30 percent, which was then required, was far below that proper for any well-designed gas stove burner.

All four ranges reported here carried the seal of approval of the American Gas Association and yet only one came close to meeting the new efficiency requirement of 40 percent (measured after burner has had time to become hot) for top burners and two of them fell far below this requirement. In spite of the present uncertainty of a range meeting all of the requirements of the American Gas Association, it will be wise not to buy any gas appliance not bearing the Association's approval insignia, for they give some assurance of compliance with very important basic requirements of safe design. In a word, if one desires for any reason to buy a range of a make or model not reported on by Consumers' Research, one can obtain *some* assurance of reasonably good design and quality, as respects elements of safety at least, by demanding a stove bearing the approval insignia of the AGA.

The report on four gas ranges which follows is a preliminary report. In spite of active steps to obtain prompt delivery of new spring models we did not succeed in doing so, and it was obviously unwise to spend subscribers' money in the test of models which would shortly be unavailable in the market, or at least unavailable in some stores. On account of the difficulties in obtaining prompt delivery of new models, two ranges which were selected for test cannot be included in this report; at the time this report was being written the ranges had not even been received at the laboratory. These late models of ranges will soon be tested—in time, it is hoped, for the results of the test to be given in the *Annual Cumulative Bulletin* in September or in another early fall *Bulletin*.

Readers of CR's previous report on gas ranges in the June 1936 *Bulletin* will remember that the *Tappan* range, besides having one of the most efficient ovens and an accurate thermostat, was outstanding among ranges in that test in giving an average burner efficiency of 47 percent (averaged for hot and cold starts). Ranges in the present test gave average burner efficiencies lying between 32 percent and 39 percent, illustrating only too clearly how much of modern "improvement" in household appliances has been in a backward direction, or in non-essentials. Although surface or cooking burners were found to be less efficient than were those in the previous test, the ovens were found to be more efficient on the average, due presumably to improvement in insulation. (A low rate of oven heat loss is valuable in contributing both to economy of fuel consumption and reduced heating of the kitchen.) Yet they did not surpass the oven of the *Tappan* range previously tested; not even the oven of the *Chambers* range was better, although this well-advertised range was far more expensive than the *Tappan*. Oven temperature controls of the ranges tested were all inaccurate as received. With the exception of Sears-Roebuck's *Prosperity*, the thermostats of the ranges tested, having fairly uniform errors, could have been satisfactorily adjusted by an expert serviceman installing the range. Subscribers should insist upon the serviceman's doing this for them.

Another matter which should demand the attention of range designers in the future is a means of providing more uniform heating of large skillets. The "daisy" type burner consisting of a number of small burner heads joined together in a circle has been shown to give relatively uniform heat distribution over a large surface. Perhaps the problem can be solved by the gas range manufacturer by using one daisy-type burner or perhaps by making one of the several surface burners extra large—much as the electric range manufacturer does. Unfortunately at the present time most gas ranges do not heat a large skillet as uniformly as satisfactory cooking of a steak requires (it is a fact that, properly handled, a steak can be very well cooked in a skillet with an end-result closely approximating that achieved by broiling directly over the flame).[1]

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[1] On the possibility of use of gas for broiling involving elements of danger to health, see *Consumers' Digest*, November 1937. Tear sheets of the article by Richard Berger will be sent on request, at 5 cents for postage and handling costs.

In selecting a range be sure that the size of the oven will be satisfactory for your own particular needs. Generally speaking, the oven should be at least 14 inches high, 16 inches wide, and 19 inches deep. This size oven, assuming the racks can be properly adjusted, will permit baking six one-pound loaves of bread at one time, or will take a roaster accommodating a medium-sized turkey. The oven should be capable of maintaining a low temperature, at about 250°F, in order to permit following the most recommended modern methods in roasting meat. (A test for performance of oven at low temperatures has not been made on the stoves listed in this report.)

In general, stove surface burners with openings in the sides instead of on top are preferable because they are less easily clogged by liquids boiling over. Burners which are constructed with an upper disk which can be unscrewed to permit easy cleaning are also desirable; burners of all ranges in the test except the *Chambers*, which had "daisy type" burners, were of this type.

The ranges included in the test were of the flat-top type, finished in white porcelain enamel and with black trim. The *Chambers* range was distinctive in having an insulated well-type top burner, called a *Thermowell*, intended to cook by retained heat and thus save fuel. This range also had a unique broiler located in the range top instead of, as in the other ranges, below the oven. The *Chambers* range had snaps or latches acting as locking devices on all valves to prevent accidental opening —a desirable feature from the standpoint of safety, especially where there are children in the family, though unintentional opening of a gas range valve can occur through accident even with adults. The other ranges had safety locking devices on the oven valves only.

The ranges were all given a general engineering examination and were tested for efficiency of top burners in bringing to a boil two quarts of water in a bright aluminum vessel, from a temperature of 70°F. (The method followed in determining the efficiency of the burners differed slightly from the method followed by the American Gas Association as approved by the American Standards Association. It is of interest to note, especially for teachers of science and home economics, that the efficiency determined in any such tests may depend to a degree on the method of test chosen as the standard. For example, if three instead of two quarts of water, or an initial temperature of 60°F instead of 70°F had been chosen, the efficiency found for the burner in heating the water would have come out differently. Even the type, diameter, and finish of the pan used introduces a variable in such measurement.) Other tests determined the effectiveness of oven insulation, and the accuracy of the thermostat for controlling oven temperatures. Additional tests are still under way at the time of writing. Burner efficiencies given in the listings are the average of the efficiencies measured from both cold and hot starts, i.e., with the vessel put over the burner at the time it was lighted, and with the vessel placed on the burner after it had been operating for a time. Because all ranges gave performances below what a good modern range should give if manufacturers followed the principles of recognized good design, it is clear that no range of the present group warrants a rating higher than *B*. All ratings are cr 38.

B. Intermediate

Grand, No. 10 (The Cleveland Co-operative Stove Co., Cleveland) $69.95 list, with 30% discount when ordered by mail, plus freight. Burner efficiency somewhat low, averaged 38%. Rate of heat loss from oven, about average. Oven thermostat as received, inaccurate; when set at 300°F and 500°F, gave oven temperatures of 273°F and 466°F respectively. Provision made for attachment of flue. Oven dimensions, height 13¼ in., width 16 in., depth 18¾ in. **2**

Chambers, No. 11 (Chambers Corp., Shelbyville, Ind.) $149.50. Burner (daisy type) efficiency low, averaged 34%. Rate of heat loss from oven somewhat below average (see general discussion for its significance). Oven thermostat as received, inaccurate; set at 300°F and 500°F, gave temperatures of 355°F and 553°F respectively. Oven vented through a louver at back of the range with no provision for connection to flue. Particularly on a high-priced range, the possibility of providing a flue connection either at the time of purchase or later, should always be assured. This range had a *Thermowell* insulated cooker which would permit long-time cooking operations to be carried on with the aid of only a small flame, an insulated oven equipped with dampers which close upon turning off the flame so as to hold in the heat, and a broiler conveniently located in the range top, instead of in the more usual location in the oven. In view of the low burner efficiency, and the comparatively small oven size, it seems doubtful if many readers would consider the advantages claimed for this range, namely, the special type broiler, the *Thermowell* cooker, and the insulated oven with dampers, worth the large extra price asked for the range—however, this is a matter which the individual will have to decide for himself. He perhaps should be cautioned to reach his decision on the basis of a fairly long period of experience with the range in the home of a user, rather than in the showroom where he will likely be carried away by a number of very persuasive talking points, if his purse easily permits his paying a considerable extra price for a cooking stove. Special features in gas ranges, while they may be desirable in themselves, seldom justify paying a much higher price than the prices asked for the standard or conventional types of ranges. While the *Thermowell* is economical with fuel, it is difficult to justify its high cost by the savings from its use, above the savings possible, say, by using a "simmer" burner whenever practicable. The simmer burner now available on some stoves, can, if properly designed, offer a very practical, convenient way of saving fuel. It is hoped that CR's tests (which are still in progress) will enable CR to report in a fall *Bulletin* on a quantitative comparison between the economy of the *Thermowell* and that of the new simmer burner. The advantage to be expected in favor of the *Thermowell* is a very small fraction of a cent for each hour of use; it would, therefore, probably require the saving accrued over several thousands of hours of cooking, to repay the initial extra cost of this device. Oven dimensions, 12 x 18⅛ x 17¾ in.—a small oven in spite of the high price of the range. **3**

Magic Chef, No. 4201-70 (American Stove Co., St. Louis) $80.50. Burner efficiency somewhat low, averaged 39%.

B. Intermediate (contd.)

Rate of heat loss from oven a little below average. Oven thermostat as received, inaccurate; set at 300°F and 500°F, gave temperatures of 267°F and 470°F respectively; initial temperature, however, reached 548°F when thermostat was set at 500°F. (This initial "overshoot" was judged unobjectionable.) Oven vented through a louver in front of splasher panel with no provision for connection to flue, a disadvantageous feature. (Note comment on flue connection under *Chambers*.) Oven dimensions, 14 x 15⅞ x 17½ in. **3**

C. Not Recommended

Prosperity, Cat. No. 22—1704 (Distrib. Sears, Roebuck & Co.) $52.50 plus freight. Burner efficiency low, averaged 32%. Rate of heat loss from oven large, but due to size of oven (only stove of group with full-sized oven). Accuracy of oven thermostat was unsatisfactory. Provision made for connection to flue. This range is not listed in latest catalog but it may still be offered in Sears' retail stores. Range, Cat. No. 22—1722, at $49.95, is identical in dimensions and appears to be similar in most construction details. Oven dimensions, 14⅝ x 18 x 19½ in. **2**

CROQUET SETS

SIX CROQUET SETS, mainly low- and medium-priced, were bought by Consumers' Research, given a careful examination for workmanship and quality of materials, and were subjected to various tests to determine their durability and precision of construction. Balls were measured to determine uniformity of weight, balance, and dimensions; the balance of the ball was determined by floating the ball in a tray of mercury. Balls and mallets were tested for resistance to impact by a number of successive blows on each, each blow having an energy value of 20 foot-pounds. Both balls and mallets were tested for resistance to deterioration by the weather, which is a factor of particular importance in determining how much "croquet service" one gets per dollar of expenditure in buying balls and mallets.

Balls of some sets varied widely in weight—the heaviest ball in one set weighing as much as 20 percent more than the lightest ball of the set. The balls of one set were considerably out-of-round—a diameter of one ball being as much as 3/32 of an inch longer than another diameter of the same ball. The differences in diameter for most balls of any set did not exceed 1/32 of an inch. The balls of some sets were far out of balance. All balls and mallets were found to have satisfactory strength under impact, but there was considerable difference between the sets as to resistance to deterioration by the weather. All sets except Montgomery Ward & Co., Cat. No. 460—5480, which was in a pasteboard box, had wooden stands for holding the balls, mallets, wickets, and stakes. All ratings are cr 38.

A. Recommended

Sears, Roebuck & Co., Cat. No. 6—2578 (South Bend Toy Mfg. Co., South Bend, Ind.) $4.79 plus postage. 6-ball set. 8-in. mallet heads, screw-in handles, 3⅜-in. balls, wicket width 5¼ in. Quality of materials and workmanship generally good, except for poor wood of handles. Resistance of finish to weather good for mallets, but poor for balls; wood remained sound. Ball weight very satisfactorily uniform. **1**

South Bend Toy Mfg. Co., South Bend, Ind., Style No. 5979. $7.95. 4-ball set. 9-in. mallet heads, screw-in handles, 3⅜-in. balls, wicket width 6 in. Wooden sockets provided for wickets. Quality of materials and workmanship generally good. Resistance of finish to weather for balls and mallets generally good, but steel non-split rings and screws on heads of mallets rusted; wood remained sound. Balls uniform in weight but not well balanced. **2**

H. Rademaker & Son, Inc., Grand Rapids, Mich. $13.75. 6-ball set. 8-in. mallet heads, handles not screwed in (judged less desirable than screw-in handle), 3⅜-in. balls, wicket width 5¼ in. Small wooden sockets, which can be driven into ground, provided for wickets. Mallets faced with medium-hard rubber, which greatly deadens sound of blow. Quality of materials and workmanship very good. Resistance to weather of finish for balls and mallets good, but steel screws, holding the non-split rings on heads of mallets, rusted; wood remained sound. Balls varied considerably in weight. **3**

B. Intermediate

H. Rademaker & Son, Inc. $6.95. 4-ball set. 8⅜-in. mallet heads, handles not screwed in, 3⅜-in. balls, wicket width 5⅛ in. Small wooden sockets provided for wickets. Quality of materials and workmanship fair. Resistance of finish to weather for balls and mallets good; but wood of mallet heads cracked slightly on weathering. Weight of balls varied considerably and they were considerably out-of-round. Metal non-split rings on heads of two mallets were loose and rattled. **2**

C. Not Recommended

Montgomery Ward & Co., Cat. No. 460—5480. $1.39 plus postage. 4-ball set. 6-in. mallet heads, screw-in handles, 3½-in. balls, wicket width 5¾ in. Quality of materials poor and workmanship fair. Resistance of finish to weather for balls and mallets poor; wood of mallets cracked badly on weathering. Balls varied considerably in weight. Wire of wickets very light in gauge. **1**

Montgomery Ward & Co., Cat. No. 460—5483 (Carey Handle & Lumber Co., Carey, Ohio) $4.69 plus postage. 6-ball set. 9-in. mallet heads, screw-in handles, 3½-in. balls, wicket width 5¾in. Quality of materials and workmanship only fair. Wooden stand for holding set was rickety. Resistance of finish to weather for balls and mallets poor; wood of mallets cracked slightly. Balls varied considerably in weight and were out of balance. **1**

CUMULATIVE INDEX
General Bulletin, Volume 7: October 1937 to June 1938, Inclusive

This index is for the issues of October 1937, Vol. 7, No. 1; January 1938, Vol. 7, No. 2; April 1938, Vol. 7 No. 3; and June 1938, Vol. 7, No. 4. Single *Bulletins* are 30 cents each. Subscription is $1 (four issues) for the subscription year, October through June.

Consumers' Research, Inc., Washington, N. J.

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FOR the benefit of new subscribers, the contents of *Bulletins* issued during the current volume year are briefly listed. The *General Bulletins* are the only issues that may be purchased by those who are not subscribers to the full service.

General Bulletins

Since the *General Bulletin* is not confidential, single issues are available to anyone at 30c a copy.

OCTOBER 1937

"Golf Balls"—a report on 12 makes.

"What's in the Can?"—in which some 22 brands of canned vegetables and 12 brands of fruits are rated *A*, *B*, or *C*, on the basis of tests made by government experts.

"Flashlights"—25 different models rated.

"Radio Today"—With Some Notes on What It Might Be Tomorrow, by Gareth Smith.

"Electric Ironing Machines"—a report of CR's test of 4 machines of the rotary type and 2 of the pressure type.

JANUARY 1938

"Shaving Soaps"—a discussion of effective shaving techniques and ratings of 13 soaps and 19 creams.

"What is Irium?" by Russell C. Erb. If you have wondered just what this "thrilling dental discovery" in *Pepsodent* was, read this article.

" 'Elixir' Poisonings," by George W. Fiero. The weakness in our present Food and Drug law which was responsible for the death of many people who took "Elixir of Sulfanilamide" is succinctly pointed out in this article.

"Gasoline"—a report of tests of over 50 gasolines, chiefly from the West and Far West.

"Plate and Film-Pack Cameras"—a report on 12 cameras of this type.

"Men's Suits"—a report of CR's test on 11 makes including *Crawford, Howard, Society Brand, Stein Bloch, Hart Schaffner & Marx.*

"Card Tables"—CR's test of 12 tables.

APRIL 1938

"Travel Notes"—brief advice on how to travel cheaply including information on Freighters.

"Razor Blades"—results of CR's test of some 30 safety razor blades.

"Mowing Beards Electrically"—a report on 8 makes of electric shavers.

"Bath Salts"—9 brands rated.

"Mayonnaise"—results of CR's test of 8 well-known brands.

"Photographic Exposure Meters"—including ratings of photoelectric and visual optical-wedge types.

Monthly *Bulletins*

The following *Bulletins* are available, at 30c a single copy, only to subscribers to CR's full service.

NOVEMBER 1937

"Toilet Soaps"—a report of the latest CR test of 32 brands.

"Radio Sets - 1938 Models"—preliminary ratings of 13 new models.

"Amateur Motion Picture Equipment"—including ratings of 8 mm cameras, 16 mm cameras, 8 mm motion picture projectors, 16 mm motion picture projectors, 16 mm sound projectors, and accessories.

"Leather Brief Cases"—discussion and ratings of 4 types, 8 makes.

"Men's Rubbers and Women's Rubber Galoshes"—ratings of 9 brands of men's rubbers, and 8 brands of women's galoshes.

DECEMBER 1937

"Men's Soft Felt Hats"—a discussion of "ash-can" hats, mercury poisoning from hats, and the results of CR's test of 12 well-known brands.

"Garters for Men Who Wear Them"—a report of tests of 13 pairs.

"Playing Cards"—a report on tests of 12 brands.

"Cameras"—a discussion of cameras in general, ratings of 7 high-grade roll-film cameras.

"Pocket Cigaret Lighters"—12 makes tested and reported on.

"Baseball Bats and Balls"—a report of CR's test of 8 bats and 8 balls.

FEBRUARY 1938

"Automobiles of 1938"—a report on all well-known makes in price groups ranging from $439 to $5135.

"Miniature Cameras"—a discussion of the various drawbacks in the use of this type by the amateur, with ratings of 21 cameras.

"High-Fidelity Radio at Low Cost"—specifications and diagrams that will enable any radio handyman or competent serviceman to build accessories to an old-style tuned-radio-frequency receiver that will provide realistic and faithful reproduction.

"Radio Sets - 1938 Models"—final results of CR's test of 18 models.

MARCH 1938

"Soap Substitutes - *Dreft* and *Drene*"—a discussion of the properties of these products.

"Used Cars"—advice on how to go about buying a used car, what to look for, with a list of defects in certain models of cars.

"Reflex Cameras"—ratings of 8 single-lens reflex cameras and 6 twin-lens reflex cameras.

"Automobile Tires"—CR's test of 13 brands.

"Linoleum"—a discussion of what to look for in buying this type of floor covering, the different types, and ratings of 6 inlaid linoleums and 14 felt-base floorings, or printed linoleums.

"Hair Preparations"—ratings of 8 "tonics" and 6 hair dressings.

MAY 1938

"Automobile Radio Sets"—general discussion and ratings of 9 well-known sets.

"Buying An Egg Beater"—ratings of 15 beaters.

"After-Shaving Lotions"—ratings of 7 brands.

"Silverware Cleaners"—advice on methods, and ratings of 8 brands.

"Tennis Balls"—results of CR's test of 11 balls.

"Garden Hose"—10 makes rated.

"Electric Soldering Irons"—19 makes rated.

"Automobile Tire Gauges"—a discussion of the various types, and ratings of 10 gauges.

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Consumers' Research Bulletin

THE saving made yearly by a subscriber to Consumers' Research varies with the use to which the service is put. Armed with the information provided by the monthly *Bulletin* of Consumers' Research, thousands of subscribers have been able to effect yearly savings of considerable magnitude, especially when this amount of money is considered in relation to the small yearly fee charged for the service. The letters following are typical of many. They tell their own story—what is more, they help *you* to tell your friends how they also can save appreciable sums of money yearly.

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"I don't know just how many members have very small incomes so am just stating what this work means to me financially.

Income during the past year	$950
Money expended buying recommended products approx	450 (conservative)
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... Why not try selling the service on an investment basis? I have worked it out very crudely, but believe it could be built into a real appeal." (Insurance Broker)

"I would like to tell you at this time that I consider my subscription cost to Consumers' Research more than repaid me in the annual Automobile Number alone. The other material is also of great value, but since I get a new car once in two or three years, albeit a Ford or Plymouth, I want to get the best value I can, and it is on such a major purchase that Consumers' Research is most valuable." (Army Officer)

"... I've sold my short-wave radio at $20 and have bought for $25 an old RCA-Victor Model 45 Radio-Phono combination. I'm 100% satisfied, and your suggestion is easily worth the $3 asked for a year's subscription." (John Coleman, New York, N.Y.)

"Like most people I resent knowing that I am a dupe, and am grateful for the information that saves me from being taken in by the siren voices of advertising." (Housewife)

"I want to commend you for your excellent and enlightening articles on radios which you have published. Eventually this should benefit the radio purchaser, in better radio and less ballyhoo. Am enclosing stamped self-addressed envelope and request that you send me the article on ink as mentioned in the Annual Cumulative Bulletin." (Subscriber from Ogden, Utah)

SHOW THIS *BULLETIN* TO YOUR FRIENDS

THE June *Bulletin* is not confidential. Show it to your friends so that they may see for themselves just how much helpful, money-saving information appears in a single number of Consumers' Research *Bulletin*. Then tell them about the *Annual Cumulative Bulletin* which contains over 200 pages of just such information on many more subjects. A copy of the 1937 *Annual Cumulative Bulletin* is sent free of charge (while our supply lasts) to all new subscribers. The new 1938 *Annual Cumulative Bulletin* will be mailed about September 15, 1938.

For New Subscribers

Consumers' Research, Inc., Washington, N.J.

O I enclose $3 (Canada $3; foreign $3.50) for one year's subscription to the Consumers' Research Bulletin (which includes Annual Cumulative Bulletin number and monthly Bulletin numbers—except during July and August).

It is understood that my handling of any CR material which is marked "The analyses of commodities, products, or merchandise appearing in this issue are for the sole information of subscribers" will be in accordance with that direction.

Name.....
(Please write in longhand)

Street.....

City.....State.....

My profession or business is.....

CR-6-38

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ADDITIONS TO YOUR "Consumer Bookshelf"

CONSUMERS' TEST MANUAL

For teachers of college and high school science classes who are interested in orienting their courses around consumers' problems, this Manual provides some seventy-five tests. Directions are set down in detail and lists of apparatus needed are provided. Included are tests To Distinguish Fresh Butter from Renovated Butter and Oleomargarine, for Gelatin in Ice Cream, for Starch in Face Powder, for Lead in Paint, etc.

38 pp (including Index) 50c

EAT, DRINK AND BE WARY
by F. J. Schlink

This book discusses the factory-originated trend, now well-nigh universal, toward refined, demineralized, and devitaminized foods. This trend has been followed by futile attempts to restore the old balance of nutritive elements that characterizes natural, unadulterated, honestly prepared foods, by putting over excessive roughage, vitamin D bread, canned orange juice, cod-liver oil, raw vegetables, and other diet quackeries. Diet fads indulged in by the poor and ignorant, and by the well-to-do and educated classes alike, are discussed. The wide propagandizing of milk as a "health food" is shown to be a triumph of big business enterprise and subsidized science rather than a genuine discovery of unbiased, disinterested nutritional scientists.

A constructive summing-up is given of what really *is* known about food science, by experts who aren't hired to have particular views in favor of bran or oranges or viosterol or irradiated milk. The author shows how and what to eat in order to avoid, as well as one can, adulterated, overrefined, and downright dangerous foods and beverages.

Special CR Edition $1

GUINEA PIGS NO MORE
by J. B. Matthews

This book should be read by everyone who is interested in social problems or who wishes to understand clearly various social and economic conflicts which occur daily. Who are Consumers? Are the interests of workers and consumers identical? Would the "workers' state," which is the Utopia of some of our social theorists, concern itself with abolishing patent medicines, chemicalized bread, and other mass-production food?

These questions and many others dealing with the relationship of consumers to other groups are thoughtfully discussed. It is very important to be able to differentiate clearly the concerns of people as consumers from their other roles in society as producers and workers. Teachers of courses in Consumers' Problems will find this book invaluable in orienting their courses and integrating the different parts of their program.

Special CR Edition $1

KITCHEN CABINETS

If you are about to purchase a ready-assembled kitchen cabinet you have, presumably, decided that it will be a more economical or practical solution for your particular problem than having a cabinet built into your kitchen. It is not the purpose of this article to go into the relative merits and expense of custom-built *vs.* ready-built kitchen cabinets, but rather to point out, to those who are prospective buyers of trade-marked ready-made cabinets, some of the features it seems important to investigate before buying. The kitchen cabinet should be selected very carefully since one has a right to expect this particular piece of household equipment to last practically a lifetime.

An investigation of eleven kitchen cabinets of well-known makes, by a consultant well qualified to criticize the cabinet-making, materials used, and workmanship in general, showed even greater variations in quality than the price differences might have seemed to indicate. The workmanship used in the construction of the cabinets varied from poor to excellent. Since the average purchaser may not be well versed in construction principles, a few points that can be used as a general guide are mentioned here. The doors should close completely and fit snugly in their openings without large cracks or clearances, but should not be so tight that they will not open easily. If the fit is too close, every spell of damp weather will cause the wood to swell enough to make closing impossible. This comment also applies to the construction of the drawers which should slide easily but not too loosely or too closely. All the joints in the frame should be mortised, tenoned, and glued—not nailed. The hardware should be sturdy enough for the purposes for which it is to be used—that is, the hinges should be sufficiently strong to hold the doors without sagging, and the door catches should really hold the doors closed. Some of the cabinets examined had good hardware but it was so carelessly attached as to give little more serviceability than a poorer grade. Poor hardware is a common weakness of factory-made cabinets—the makers evidently expect the purchaser not to be watchful for defects and weaknesses in hinges and latches.

The quality of the finish is hard to determine by observation, but it should be evenly applied, with no discolored areas, and if any decorations are used, they should be clear in outline and evenly applied. The material used in construction should be hardwood (oak, maple, birch). Oak is quite well adapted to the stained type of finish but for a painted or enameled finish a smoother-grained wood is preferable. Especially should the drawers be of some close-grained wood, such as maple or birch, but the drawer bottoms and the back of the cabinet should be of fairly thick plywood, because it is light in weight and strong. No cabinet showing any important elements of poor workmanship should be considered for purchase.

The standard size cabinet is about 40 inches wide, 68 inches high, 22 inches deep up to the work-top, and about 12 inches deep above the work-top. There are larger cabinets to suit the needs of larger families, and there are the much smaller sizes for kitchens of small apartments. Each furniture store probably carries samples of a single manufacturer's line, so that visits to several stores and examination of many catalogs may be necessary to gain a comprehensive enough picture of the types of cabinets available before the prospective buyer can make a wise choice. Time spent in such looking over of the field will be well rewarded.

The upper part of kitchen cabinets is for storage of cooking materials and contains shelves for storing sugar, spices, utility dishes, etc. Flour storage bins are frequently also a part of the upper section of the cabinet. This section, usually about 12 inches deep, should be enclosed by tight-fitting doors or roll-type wooden curtains. In most cabinets, the lower section is devoted to drawer space for kitchen linen, bread, and cutlery, and a storage cabinet for kettles, roasters, etc. This section is customarily about 22 inches deep. The area of shelf room should be given careful thought in terms of the amount of equipment which is to be put away out of sight in your own kitchen. Between the two storage sections is the work-top which, in some cases, is stationary, and in others, is of the sliding type which is pulled out to form a working surface.

With these general specifications in mind, the prospective purchaser should consider the following points which seem particularly important, and which may be of use in helping to decide what type is best for the individual case.

1. It is a reasonable assumption that the majority of families will want a flour bin in their kitchen cabinet, and on this point, here are some of the things to be taken into consideration: If bread is baked at home and flour is bought in large quantities, a cabinet with one of the larger bins (40 to 50 pounds capacity) will probably be more desirable. For the average-sized family where the home-baking is, in the main, confined to cakes, pies, and cookies, the 15- to 25-pound bin would be adequate. For those families where almost no baking is done at home, cabinets having still smaller sizes of flour bins are available. All bins should have a good sifting mechanism and be easy to fill. The type which tips forward for filling necessitates lifting a bag of flour to about shoulder height in order to empty it into the bin; this would be a serious disadvantage in the case of sizable quantities. The two most convenient types seem to be the large bins which have a lowering mechanism, allowing them to be filled at a convenient height and mechanically restored to place, and the smaller stationary bins, the tops of which are usually at the level of the middle shelf in the upper storage cabinet. These last are filled through a hole in the shelf which has a tightly fitting lid, and the flour does not have to be lifted to an inconvenient height. Almost any sifter type of bin is practically self-cleaning, due to the funnel-shaped bottom and the fact that the sifter mechanisms are removable, so that there is little advantage in the removable type of bin. Keeping

flour in a metal-lined drawer is an unsatisfactory arrangement, and cabinets where this is intended to be done were "rated down" on that point. When the flour is stored in such a drawer, the danger always exists of dropping crumbs and other bits of kitchen material into it from the edge of the work-top, every time the drawer is opened; if the flour is kept in a bag in the drawer, there is the inconvenience, every time the housewife uses flour, of taking out the bag and dipping into it.

2. A metal-lined bread drawer is a desirable piece of equipment in a kitchen cabinet.

3. There should be a breadboard with a special, convenient storage space provided for it (often a slide or holder under one of the storage shelves), as there is no kitchen utensil for which it is harder to find a clean, accessible place.

4. The work-top should be of the best height from the floor for the person who uses it most. About 32 ½ inches has been determined by experiment to be a good all-purpose work-top height for the average woman. It is relatively easy to *raise* the height of the work-top by building a simple base of the required additional height under the cabinet; on this account a cabinet which is low but otherwise satisfactory should not be eliminated by the tall woman. It is practically impossible, however, to *lower* the height of a work-top, so the exceptionally short woman should look into this situation with care. The working heights of the cabinets examined all came within a range of 31¼ to 34½ inches. None of the cabinets were penalized for deviations from the standard height, since the work-height was felt to be for many a matter of personal choice. The outer edges of the work-top should be raised slightly to prevent eggs, fruit, etc., rolling off but should not be raised so much as to make cleaning difficult.

From examination and the experiences of housewives interviewed, the stationary type of work-top would seem to be definitely superior to the sliding kind for several reasons. No sliding top can have the stability of a stationary one, and crumbs and debris of various kinds are pretty certain to be carried back under the stationary part of the cabinet when the sliding part is pushed in. A further disadvantage of the sliding top is that when the top is extended, the drawers immediately beneath it are practically inaccessible. Some manufacturers have sought to overcome this disadvantage by having the top drawers move out with the sliding top; but this arrangement has brought its own difficulties of making access to the lower drawers more troublesome, and in the sample examined, there was the further disadvantage that even when the work-top was pushed in as far as it would go, the top drawers did not close completely, and even when not in use, the cabinet did not have a fully neat and ordered appearance.

The work-top should be surfaced either with porcelain enamel or stainless metal. Porcelain enamel is often acid resistant and stain resistant but may discolor, or the finish become dulled, when a spot is allowed to remain too long without cleaning. It may also chip with severe usage, and it is safe to assume that in time such chipping will occur in practically anyone's kitchen. Stainless metal does not chip and is very hard to stain, but scratches show up rather objectionably. Methods of cleaning both are much the same, except that an abrasive cleanser should not be used on porcelain because after a time the surface will become dulled when any scouring powder type of cleanser is used. On metal surfaces, it may be necessary to use an abrasive cleanser to work down the scratches.

5. There should be a lid rack of some sort on the door of the lower cabinet. The manufacturers of some of the cabinets examined have thus satisfactorily solved the aggravating household problem of lid storage.

6. The wire shelves for storing kettles, roasters, etc., should be of sturdy enough materials so that they will not bend and warp under the weight of sizable utensils. Some of the racks examined were not strong enough to hold a heavy roaster, for instance, without excessive bending under the load.

7. Cabinets should not have legs but should extend to the floor with a base recessed for toe-room. This eliminates the problem of cleaning under the cabinet, and permits greater storage space. If a cabinet has any legs at all, they should be at least eight or nine inches long in order to raise the bottom high enough to make for easy cleaning underneath; this uses at least as much space as might be taken up by a good-sized drawer and CR considers a cabinet raised on legs wasteful of space.

8. A drawer with divisions for tableware, cutlery, etc., is a desirable feature, since many families eat in the kitchen or in dinettes opening from the kitchen. None of the cabinets examined had such a drawer, but the Montgomery Ward *Kitch-N-Aide* Cabinet, Cat. No. 266 C 4305, mentioned briefly but not examined, had one.

CR has attempted in this article to make some logical and practical recommendations about ready-assembled kitchen cabinets. It is a new subject and almost nothing that CR considers valuable and reliable has been written about it by state agricultural departments or home economists so far as we can learn; subscribers' ideas and reactions on the kitchen cabinet problem will be welcomed as there are many points which only long use can bring to light. Letters from our subscribers expressing their reactions to our points, and making any suggestions based on experience with the subject, will be welcome, and at some future time CR will make the information, so accumulated, available to its readers.

Prices will likely vary widely in different sections of the country and even between different stores in the same city. All ratings are cr 38.

A. Recommended

Hoosier, Model 63 (Hoosier Mfg. Co., New Castle, Ind.) $32. Built-to-the-floor type, workmanship good. Stationary work-top; small stationary flour bin, easy to fill (capacity about 15 lb). Metal-lined breadbox, breadboard with storage space, lid rack. Wire utensil shelf judged not to be strong enough to hold heavy cooking kettles. **1**

Hoosier, Model 66 (Hoosier Mfg. Co.) $49.50. Built-to-the-floor type, workmanship excellent. Stationary work-top; small stationary flour bin, easy to fill (capacity

A. Recommended (contd.)

about 15 lb). Metal-lined breadbox immediately beside flour bin, breadboard slides under utensil shelf, lid rack on door of lower cabinet. Wooden utensil shelf judged to be strong enough to hold heavy cooking kettles. **3**

B. Intermediate

Sellers, Model 800 (G. I. Sellers & Sons Co., Elwood, Ind.) $40. Built-to-the-floor type, workmanship acceptable. Stationary work-top; stationary easy-to-fill flour bin (capacity about 25 lb). Wooden shelves in utensil storage cabinet would hold heavy kettles. Drawers moved easily but firmly. No breadbox or board, and no lid rack. **3**

C. Not Recommended

Marsh, Model 367. $28. Not built-to-the-floor, workmanship acceptable. Sliding work-top. **1**

Sears, Roebuck & Co., Cat. No. 1 HM 21512. $25 at retail store; hardwood model, $18.95 plus transportation when ordered from catalog. Not built-to-the-floor. Sliding work-top. **1**

Showers, Model 7613. $25. Not built-to-the-floor. Sliding work-top. No breadboard, no lid rack. **1**

Wards, No. 62830. $27.95. Available in retail stores only. Not built-to-the-floor. Sliding work-top. No bread drawer, no breadboard, no lid rack. **1**

C. Not Recommended (contd.)

Kuehne, Model KC-6. $37.50. Not built-to-the-floor; toe-room so small that cabinet cannot be conveniently cleaned under. Workmanship superior. Long utensil drawer which does not move out with the top is directly under sliding work-top making the drawer inaccessible when top is in use. **2**

Sears, Roebuck & Co., Cat. No. 1 HM 2144. $37.95 at retail store; $24.98 plus transportation when ordered from catalog. Not built-to-the-floor. Sliding work-top extends directly over cutlery drawers (note comment on *Kuehne* KC-6). **2**

Nappanee, Model 4076 (Coppes Bros. & Zook, Nappanee, Ind.) $45. Not built-to-the-floor, workmanship superior. Sliding work-top. No flour bin, but two metal-lined bread drawers one of which may be used for flour (an arrangement judged unsatisfactory for majority of users). No breadboard, no lid rack. **3**

Wards, No. 62987. $49.95. Available in Ward's retail stores only. Not built-to-the-floor, workmanship excellent. Sliding work-top. No lid rack, no flour bin, but two metal-lined bread drawers one of which is intended to be used as a flour bin (see comment under *Nappanee*). [Ward's *Kitch-N-Aide* Cabinet, Cat. No. 266 C 4305. ($48.95 plus transportation) is apparently superior to either of the *Wards* cabinets listed under *C* but was not examined for workmanship.] **3**

HIGH-FIDELITY RADIO AT LOW COST

In the February 1938 *Bulletin* directions were given for constructing a high-fidelity radio using an old-style tuned-radio-frequency receiver. The comments we have received from subscribers who have followed our advice have been most gratifying and have well repaid us for the time and energy put into this article by CR's technicians and outside consultants who gave valuable advice and aid in developing the details of the design. There are no doubt many subscribers who have wondered whether the extra advantage of such a set might warrant the expenditure and trouble involved. The following two excerpts from the many enthusiastic letters received from our subscribers on this new way of building a fine radio cheaply may furnish the assurance which some may need to convince them of their own probable success in building, or having built, such a radio receiver.

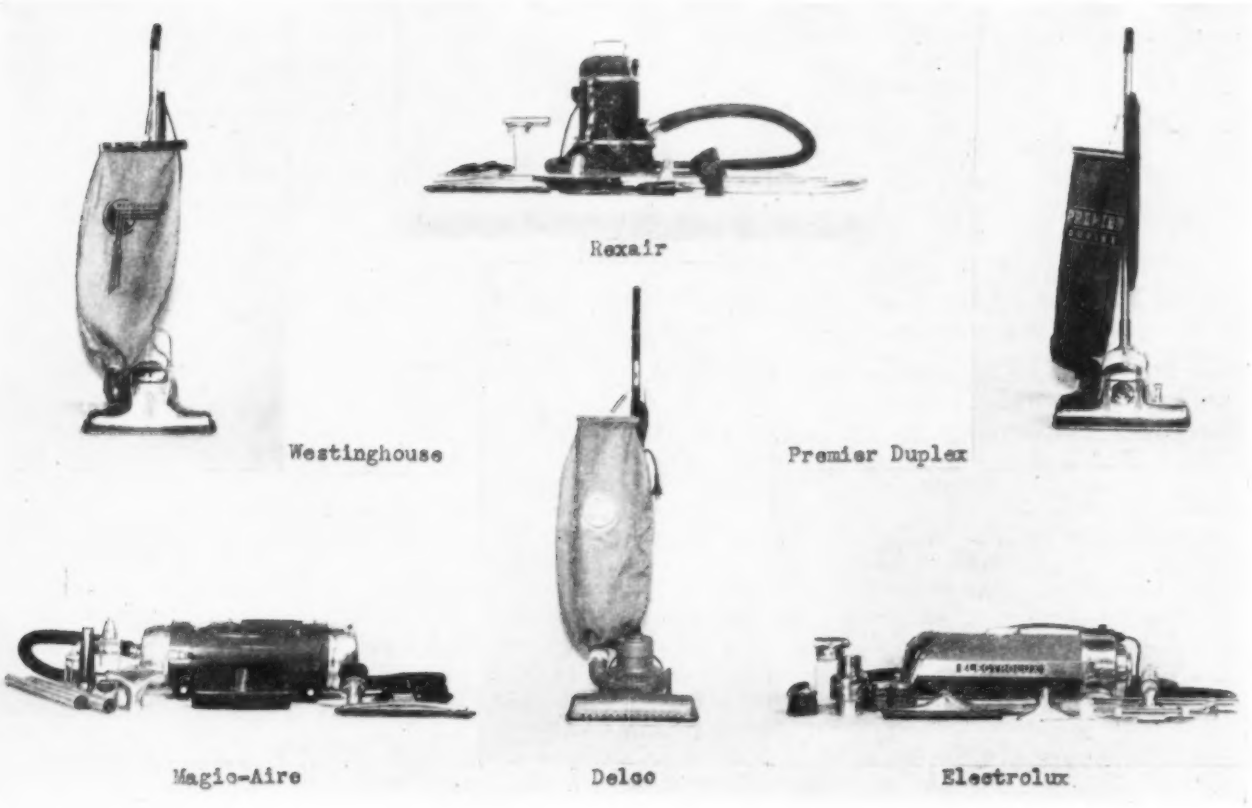
"I have just constructed the high-fidelity radio amplifier described in your February 1938 Bulletin. The results from it are truly remarkable and although I am an electrical engineer, I have never heard of its equal in tonal quality and lack of distortion....

Construction work is very simple and anyone familiar with tools should be able to build this amplifier with ease. The results are worth many times the cost in time and money. Few people have ever heard high-fidelity broadcast reception." John A. Deady, Instructor in Electricity, Newark, N.J.

* * * * *

"I have just recently completed the construction of a radio and phonograph combination. It was constructed according to the specifications contained in the February Bulletin. I was at first somewhat skeptical, and the expert whom I consulted did not offer much encouragement, but as we proceeded he became much absorbed in the work, and now assures me that in all his fifteen years in radio work he has never known a receiver that quite equals this one. My wife, a trained musician and choral conductor, agrees with him. As for myself, I am so pleased that I have a second one nearly completed and have purchased the cabinet for a third. I have had the advantage of comparison with a recent rather expensive model of one of the well-known receivers, a receiver which I feel that I must now discard."—Judge E., Salt Lake City.

ELECTRIC VACUUM CLEANERS



THE TECHNIQUE of the vacuum cleaner salesman today is so impressive that the average housewife will find it extremely hard to muster enough sales resistance to refuse to buy the latest shining, streamlined, gadget-embellished vacuum cleaning creation. Its maker will have seen to it that in every respect of appearance and talking points it has been so developed and designed as to put her old model to shame. Fortunately, however, Consumers' Research is in a position to assure the housewife-prospect that there have been no significant improvements in the *dirt-removing abilities* of the late models. It is the dirt-removing capacity, after all, which is the essential factor in purchasing a vacuum cleaner, except for that limited number of consumers who rely upon the new vacuum cleaner or the radio or electric refrigerator to establish social and economic prestige with friends and neighbors.

The trump card being played in recent years by the well-trained purveyors of cleanliness is an elaborate claim and demonstration for the moth-proofing possibilities of the vacuum cleaner. Obviously, if the housewife can be led to think that she is not only buying a vacuum cleaner for her $60 to $80 expenditure, but also complete assurance against moths in her furs and her husband's suits, she will be put into a mood where the price of the cleaner does not seem so high and she will be more willing to pay the heavy cost of high-pressure personal salesmanship and "distribution expense" which has always characterized this industry. One of the great concerns hitherto known for a relatively conservative policy in selling and advertising, has gone over lock, stock, and barrel to the moth-control appeal. General Electric Company has now teamed up with the manufacturer of *Larvex* to make American consumers moth-conscious, and has embarked on a gigantic advertising campaign on this theme.

It is to be expected that all of the effective tricks in the advertiser's armament will be used in this effort. Already the old reliable quotation from a government scientific bureau to give the claims a touch of authenticity has been used.

The statement, "Larvex is favorably mentioned by the U. S. Bureau of Standards," will sound very plausible to the uninformed, but it is not valid in the sense the consumer will understand. CR's subscribers will know that the Bureau of Standards does not make comparative studies of moth treatment solutions, and indeed pretends to no degree of expertness in this field of moth-control in fabrics. *Larvex* is not in fact a product recommended for this purpose by the government's official entomological experts. Our subscribers should note that such a statement would not appropriately come from the Bureau of Standards, but from the Department of Agriculture's Bureau of Entomology. CR's subscribers will also have a further reason not to place much weight in such statements that may be made about vacuum cleaners, or mothproofing materials,

or mothproofed fabrics, because one of the distinguishing characteristics of federal government bureaus is their unwillingness to give testimonials to products, and especially to recommend products in terms of brand names or evaluate *comparative* merits of trade-named articles. (It is this unwillingness coupled with a lack of willingness to investigate consumer goods at all, that has made the work of Consumers' Research so necessary and so distinguished by contrast with that of tax-supported federal and state governmental bureaus.)

It is important to bear in mind at any rate that you should buy a vacuum cleaner strictly as a cleaning device. Discount to the extent of 99 percent all claims made for the control of moths and insects in the home, and before you believe anything said about a government bureau's support of the vacuum cleaner manufacturer's claims in any field, call upon the manufacturer or his agent to provide you *for your files*, with an authenticated *photographic* copy of the alleged proof of efficacy for the cleaner or for the mothproofing qualities it (i.e., the vacuum cleaner) is asserted to have.

An old reliable and favorite demonstration of the salesman is to show that the cleaner can get dirt out of things which the housewife thought were clean. For instance, in the straight suction type, a piece of clean, white cloth may sometimes be placed over an end of the wand at one of its joints, and then a rug or some other article is cleaned which the housewife will have gone over previously with her own cleaner, and therefore will concede ought to be clean. Of course, with this test the salesman gets plenty of dirt, which shows up as a grey smudge on the pure white cloth. The point the housewife misses—and this is the trick in many a convincing demonstration—is that any other cleaner would have given exactly the same effect with an equally clean floor or rug and a white cloth. Thus the housewife has been convinced by a mere trick, of the superiority of one cleaner over another when in point of fact, her old cleaner may have been better than the new one so cleverly demonstrated. When you see any vacuum cleaner demonstration, try to think of the probable trick in it, because most cleaner manufacturers have worked out a set of such demonstrations. Each such scheme of demonstrations is devised to develop some advantage or pretended advantage of his own appliance as against those of his competitors. A real simplified TEST of a vacuum cleaner—and such could easily be contrived—would be an honest demonstration, if comparative; but this would, unfortunately, only work to the advantage of the one vacuum cleaner which is really the best of the field. No one, of course, has thought of being so candid with the consumer as to work out demonstrations which really prove something and are technically sound, and fair to competitors.

There are certain objectionable practices employed by vacuum cleaner salesmen in demonstrating their products, which, we feel, should be brought to the attention of subscribers so that they may be forewarned. Here are actual examples.

The salesman without permission picked up a cushion from a studio couch and placed it in a rubber bag, offered at $12.50 additional as a garment cleaning attachment or accessory. The air was then sucked out of the bag by the vacuum cleaner; this operation collapsed the cushion under atmospheric pressure outside and a partial vacuum inside the rubber bag. When the cushion was removed from the bag, it had been irretrievably damaged; its springs protruded, and the padding was found upon opening the cushion to have been pulled away from the springs by the violent distortion of the cushion under the collapsing pressure. The salesman admitted the cushion was ruined but offered no compensation to the prospective purchaser of the cleaner. This demonstration, provided it works without mishap, appears to be very convincing, for when all the air is withdrawn from the bag, the cushion is compressed to several times less than its normal size, and it requires little credulity on the prospect's part to believe that all the dirt has been removed from the cushion along with the air which formerly occupied it when it filled a greater volume. Actually, however, little or no dirt has been removed because of the slow rate at which the air passed out of it when the rubber bag was exhausted.

Another objectionable practice, commonly used by vacuum cleaner demonstrators, is to "shampoo" half of a rug, leaving the other half dirty "for comparison." One salesman, after this demonstration was over, made no attempt to finish "cleaning" the rug and had to be asked to do so. Here again any such demonstration fools the prospect into believing that the process is much more effective than it actually is, because the part of the rug that has been treated to the shampooing only *looks* cleaner as a result of its being damp, a little of its surface dirt removed perhaps, and hence brighter looking.

One effect on the prospect of this technique is perhaps to add one more to the reasons which are supposed to move him toward a purchase of the cleaner. Unconsciously he will be affected to an extent at least, by the desirability of obtaining possession of the cleaner in order to finish the "cleaning" of a rug which the demonstrator has made a beginning on. The prospect, of course, will not, as a rule, know that this is an undesirable and ineffective method of cleaning any rug, a point to be discussed later in this article.

MOTOR-DRIVEN BRUSH SWEEPER TYPE VS. STRAIGHT SUCTION TYPE

In the present tests of vacuum cleaners, there were two main classes—the straight suction type (which included the *Electrolux*, *Magic-Aire*, and *Rexair*) and the more orthodox sweeper type with the motor-driven brush (represented by the *Westinghouse*, *Delco*, and *Premier Duplex*). Which is the preferable type to buy cannot be answered categorically, as it will depend almost entirely upon the requirements, likes, and dislikes of the user. For those who are undecided which type will best meet their needs, some advantages and disadvantages are discussed.

The straight suction type has two to six times as much suction power as the revolving brush sweeper type. This extra suction power is not an advantage but a necessity, being required by the absence of a motor-driven brush to loosen the embedded dirt. While the present test shows that the straight suction type picked up more test-dirt than the revolving brush type, the latter has the advantage that, due to the brushing action, carpets and rugs have a much cleaner *appearance* than when cleaned by the straight suction sweeper, for example, of the *Electrolux* type. These straight suction sweepers (*Electrolux*, *Magic-Aire*, and *Rexair*) are definitely easier on the rugs, but on this point which demonstrators of non-brush-type machines may make much of, CR believes that the amount of nap removal and wear caused by the revolving brush is, for the average person who does not have very *valuable* rugs, a matter of small concern. (This comparison refers to the straight suction type *versus* the suction-and-brush type; it does not relate to a type using suction with a combination brush and beater, such as the *Hoover*.)

The *Electrolux* type of cleaner is usually much quieter in operation than the sweeper type, and there are many circumstances in which extra quietness in a cleaner is important—for example, the presence of a sick or nervous person, a scholar or writer or other person doing concentrated intellectual work, in the home.

Several owners of *Electrolux* cleaners were interviewed in order to obtain some idea as to why they bought the *Electrolux* in preference to a sweeper type. Most of them said that it was on account of the demonstration given by the salesman and previously they had no intention of buying any vacuum cleaner, until the salesman put on his show. The consensus of opinion was that it took them some time to get used to the *Electrolux* type after using the more conventional form of vacuum sweeper type, but those who did not get discouraged right away and persisted until they became accustomed to it, came to like it. This, naturally, does not take into consideration a very important factor in consumer satisfaction, that the majority of people who paid around $80 for an appliance will not admit to themselves that they have made a bad choice. They, therefore, tend to achieve a biased opinion of their purchase in any such case, as a means of avoiding self-criticism on their having rushed too quickly or too casually into an expensive purchase. CR presents these points about the *Electrolux* type cleaner which is now getting to be more popular and which is being rather widely imitated by many makers, because many show by their correspondence that they are prone to assume that either one type or the other has all of the arguments in respect to convenience or ease of operation. This is not the case, and the consumer will choose more wisely if he will understand that this is a highly controversial question in which the individual housewife's attitude or preference will often play a large part, irrespective of the engineering or utility features or performance of the cleaner.

The attachments included with the suction-type cleaners (and which the maker furnishes with the cleaners without option of their omission at a lower price) are in CR's opinion, more convenient to use than those which are commonly purchased as separate attachments at an extra price, for the vacuum-sweeper-type cleaners. It is well, however, to beware of vacuum cleaner attachments in general, for there is a wide variety of them which are not of much use—no matter how attractively they may be demonstrated or how cheaply they may seem to be available. It is believed that attachments for shampooing rugs or waxing floors are not in general efficient, although this statement cannot be made with certainty in respect to every make, as this test did not include any evaluation of such attachments. Attachments are, when the time in connecting and using them is considered, evidently of small value, and housewives rarely make more than occasional use of them after the novelty has worn off. They are, however, a most valuable aid to salesmen for demonstration purposes in making a sale.

Rug-cleaning compounds, sold for use with vacuum cleaner attachments and often magical in their effects—according to the demonstration—should not be used, as they are usually soap, soda, or trisodium phosphate, or irrational mixtures of such substances at excessively high prices. (One manufacturer gets $11 a pound for a soap sold for this purpose.) No short-cut rug-cleaning method is safe. Even washing with pure chip and bead soaps and lukewarm *soft* water, which is a possible though not fully satisfactory method, is recommended *only* if thorough rinsing and complete drying at a temperature not above 100°F are practicable.

The *Rexair* differs from the usual cleaner of its type in that the dust and dirt are collected not in a bag as dust, but in a chamber containing water, resulting in a mixture best termed mud. Any dust which fails to be trapped in the water tank is caught in a small concealed bag at the top of the cleaner.

This method of extracting the dust from the air which passes through the cleaner, attractive as it is from a sales point of view, affords, on the whole, only dubious advantages. The unpleasantness of breathing the dust when emptying the bag-type of cleaner, such as the *Electrolux* or *Magic-Aire*, is probably more than offset by the nuisance of disposing of the dirty water and mud from the *Rexair* and then, besides, getting rid of the dust from the little dust-bag which collects the residues that have escaped the water trap. CR advises that the following statement appearing in the *Rexair* instruction booklet may be completely discounted:

AIR CONDITIONING—HUMIDIFYING:

Rexair may be used to advantage to circulate, and wash the air in your home and to raise the degree of humidity to a healthful stage. This is especially beneficial in cold weather, during the time the home is heated and a dry atmosphere prevails. Temperature, humidity and circulation are essential to both a healthful and comfortable atmosphere.

In the first place, as readers of CR's May *Bulletin* will know, added humidity, contrary to the claim of

Correction to Consumers' Research Bulletin, June 1938

Page 20 Change the 9th and 10th lines of column one to read as follows: The amount of water evaporated per hour by the Rexair may run to 1 pound, or thereabouts. However, this amount will vary greatly with the temperature and relative humidity of the air in the room.

8.51

Rexair, is *not* essential to "a healthful and comfortable atmosphere"; in the second place, humidity added artificially instead of being beneficial may in fact often do harm. Even if artificial humidification were desirable, however, the *Rexair*, consuming as it did, more electricity than five one-hundred watt lamps, would be a disadvantageous, and of course noisy, method of accomplishing it. The amount of water evaporated per hour by the *Rexair*, in an actual trial, was found to be 1.7 pounds.

Rexair failed to point out the fact, but it was the case, that the air exhausted by that cleaner was several degrees warmer than the air going into it—which one can see does not lend itself well as a talking point in a hot climate—a fact which may account for its omission from the instruction book's discussion of "air-conditioning."

* * *

With the old models of the suction-type cleaners, the main difficulty experienced was their failure to pick up lint and animal hair. This appears to have been greatly improved in some of the present models. In the *Electrolux*, the nozzle, which is on a swivel joint, is turned over, bringing a comb device which is part of a second nozzle into contact with the carpet; this loosens threads, lint, hair, etc., which are then quickly gathered in by the suction of the cleaner. In the *Magic-Aire*, a small, adjustable brush at the rear of the nozzle-opening can be engaged with the carpet by lowering the wand slightly, likewise serving to loosen adhering fibers or hairs. The action of the *Magic-Aire* in this respect is not as efficient as that of the *Electrolux*, since the threads, etc., are not picked up readily, except when the nozzle is pulled towards the operator, and then several movements of the nozzle back and forth may be required to pick up the threads or hair. The *Rexair* uses still a different device for this purpose, and this proved very inefficient. It consisted of a small comb in the form of a circle one inch in diameter which was brought into action by raising the wand into a nearly vertical position where it was difficult to operate and required several movements of the nozzle back and forth to accomplish the purpose of picking up the adhering fibers or hairs.

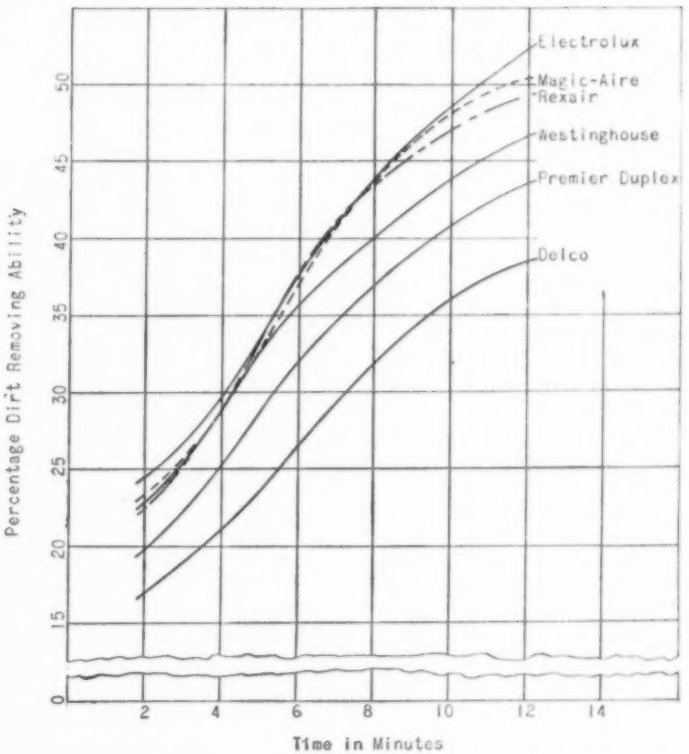


Chart showing percentage of dirt removal at different periods of operation on 6 x 9 ft rugs.

Because of the importance of discussing other matters of more practical importance to the consumer in the space available in this *Bulletin*, the technical methods of testing the cleaners have not been described. They were closely similar to, though not identical with, those reported in CR's *Bulletin* of November 1936.

SAFETY REQUIREMENTS

The electric vacuum cleaner, if not adequately and durably insulated, is probably the most dangerous of electrical appliances used in the home. Its special hazards arise from a number of circumstances, principal among which is the fact that it is not uncommon for the operator to move one or more lamps or other electrical appliances out of the path of the cleaner while it is in operation. This fact greatly increases any hazard which may result from a defect in the cleaner itself, due to the defect of the cleaner coming into electrical relationship with the lamps or wiring which themselves often have electrical defects or omissions — possibly minor in themselves but dangerous in relation to the other electrical appliance. CR is glad to be able to report that all of the six cleaners tested as received successfully passed the electrical insulation tests for shock hazard, so that in their new condition they all could be regarded as entirely safe. Vacuum cleaner manufacturers should take great precautions against electrical shock hazard because of the hard use and abuse which a cleaner gets, the fact that it contains moving parts, and that its motor runs at a high speed, and the further fact that it is moved about and into relationship with other electrical appliances and with grounded metallic articles, such as water and steam piping, radiators, refrigerators, stoves, and the like. The *Rexair's* design constitutes a special and difficult problem, for it is equipped with a centrifugal water separator which consists of a cup-shaped stamping with vanes which rotates at high speed with the motor shaft. These vanes are

intended to throw out whatever water is entrained in the air stream coming from the water-chamber (where most of the dust is trapped and separated from the air entering the nozzle). After 300 hours of the endurance test, the water separator (which requires careful cleaning after every few hours of use) was found to be loose on the shaft. When this condition occurred, droplets of dirty water passed into the motor in the air stream, and up onto various live electrical parts, and were thrown out at the blower end of cleaner or leaked out through joints of the casing. In this condition the limits of leakage current for fundamental safety requirements were greatly exceeded, and the appliance became distinctly risky to handle, for the electrical leakage current went up to values spelling positive danger to the user of the appliance. (It seems that it would in fact be extremely difficult to build a commercially salable type of water-trap vacuum cleaner that would be free from positive, practical hazard of electric shock to the user. It is our opinion that this type of cleaner could not practicably be made electrically safe for the non-engineering user.)

NOISE AND RADIO INTERFERENCE

Tests for the noise produced by the vacuum cleaners were conducted in a large room with a microphone and electrical audibility meter. The audible noise was measured in terms of decibels above the threshold of hearing. The results of this noise test are given in the listings. Tests were made for radio interference, but it was found that none of the cleaners tested set up sufficient radio noise to be objectionable.

The dirt-removing abilities as shown in the chart (page 20) are based on the average figures obtained for both high- and low-pile rugs—both when the bags were freshly and entirely cleaned and when dirtied by use, as such an average seemed to be the most accurate way of approximating the ordinary and variable conditions of use in the home. All cleaners were subjected to an endurance test by running them for one hour and allowing them to rest for an hour, until each cleaner had been operated a total of 500 hours. Unfortunately, this group of cleaners showed no appreciable improvement over the last group reported on by CR. In the present test only one cleaner, the *Electrolux*, stood up for the full period of the endurance test.

Some makes of cleaners are obtainable from many stores at prices considerably lower than the list price. In purchasing these models for CR's test, however, with the exception of *Westinghouse*, list prices were paid in each case. Prices paid for the *Westinghouse* and also for the cleaners brought forward from CR's earlier test are given in parentheses following the list price. The wattage claimed by the manufacturer is also given in parentheses following the actual wattage as measured; when the two figures were in practical agreement, only the rated watts are given. Ratings are cr 38 except as noted.

A. Recommended

Westinghouse, Model RS 3 (Westinghouse Electric & Mfg. Co., Springfield, Mass.) $49.95 ($40). Watts 315. Revolving brush type. Screw knob for adjustment of height of nozzle for different surfaces, but no means provided for indicating height of nozzle so that a given setting found correct for a particular rug or floor could be easily re-established by the user. Ranked fourth in dirt-removing ability. Wear on rugs about average. Noisiness above average. Weight, 13 lb. **2**

Electrolux, Model 30 (Electrolux, Inc., 500 Fifth Ave., N.Y.C.) $78. Watts 507 (475). Straight suction type. The most efficient in dirt-removing ability of the six cleaners tested. Ability to pick up threads, lint, animal hair, etc., best of the straight-suction-type cleaners tested. Wear on rugs low. Noisiness below average. Had sled-like "runners" for moving unit while cleaning, or when this was inconvenient, could be lifted up and carried bodily, though it was somewhat heavier than the average cleaner tested. Total weight (unit, wand, and nozzle), 20½ lb. **3**

B. Intermediate

Magic-Aire, Model 145 (The Cleveland Suction Cleaner Co., Cleveland) $59.50. Watts 500. Straight suction type. Ranked second in dirt-removing ability, but only fair in picking up lint, threads, animal hair, etc. Wear on rugs low. Noisiness below average. Failed in endurance test after 100 hrs of operation, brushes and commutator were badly worn; may on this account warrant a *C* rating unless binding guaranty providing repairs absolutely free up to 500 hrs of operation can be gotten from manufacturer over signature of a company official. Completed endurance test after brushes were replaced and commutator smoothed and cleaned. Swivel connection between hose and unit stiff and hard to operate. Had four wheels for moving unit while cleaning, or when this was inconvenient, could be lifted up and carried bodily, though it was somewhat heavier than the average cleaner tested. Total weight (unit, wand, and nozzle), 19 lb. **2**

C. Not Recommended

Delco, Model No. 500 (Delco Appliance Division of General Motors Corp., Rochester, N.Y.) $39.95. Watts 312 (300). Revolving brush type. Had no means for adjusting nozzle height for different surfaces—a disadvantage. Least efficient in dirt-removing ability of all cleaners tested. Wear on rugs low. This cleaner was above average in the amount of noise which it produced. In the endurance test, bad arcing occurred at the brushes after 350 hrs. Weight, 13 lb. **1**

Premier Duplex, Model No. PR 20 (Electric Vacuum Cleaner Co., Inc., Cleveland) $59.50. Watts 325. Revolving brush type. Screw knob for adjustment of height of nozzle for different surfaces, but not equipped with indicator to permit resetting to the correct height for a given rug or floor. Had two-speed motor but CR considers this feature one of small practical importance to the average user. One of the two lowest in dirt-removing ability of the cleaners tested, at its higher (more efficient) speed. Wear on rugs would appear to be highest of all cleaners tested, as indicated by quantity of wool fibers present in bag at end of each run. Was the noisiest of the six cleaners tested when operated at

C. Not Recommended (contd.)

high speed. On lower speed, noise about average. In the endurance test, bad arcing occurred at the brushes after 200 hrs and again at 450 hrs. Weight, 15 lb. **2**

Rexair (Rexair, Inc., Detroit) $71.50. Watts 572; wattage not given on nameplate. Straight suction type. Ranked third in dirt-removing ability, but poor in picking up lint, threads, animal hair, etc. Wear on rugs low. Quietest cleaner tested. Judged the least desirable of the cleaners tested; and considered to have extreme probability of developing serious shock hazard in practical use, yet approved by Underwriters' Laboratories. Air conditioning and humidifying claims not substantiated by test. Water separator loose on shaft after 300 hrs of endurance test. Could be moved by sliding on rounded base, which was somewhat unsatisfactory; when this was inconvenient, could be lifted up and carried bodily, though it was the heaviest cleaner tested. The appliance was not nearly as convenient to use as the *Electrolux* and *Magic-Aire*. Apartment dwellers (and perhaps many others), may find the disposal of the dirty water and mud somewhat a problem, and many may prefer handling a dusty bag to a muddy container, proper care of which will certainly require occasional scalding or disinfecting. Total weight (unit, wand, nozzle, and 2 qt of water), 25 lb. **3**

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The following cleaners have been brought forward from previous test findings for the benefit of new subscribers, as they are still current models. Their cleaning efficiencies were not related to those listed on the basis of the latest test, reported in this *Bulletin*, as the test methods, although similar, were not identical and hence are not strictly comparable.

B. Intermediate

General Electric, Model AV 2 (General Electric Co., Bridgeport, Conn.) $59.95 ($44.60). Ranked high in dirt-removing ability in 1936 test. Possibility of shock hazard judged to be definitely slight, though it was a little above fundamental safety requirements for electrical insulation. Belt driving the revolving brush was worn out after 150 hrs of endurance test. Operation of this cleaner was exceptionally noisy. Weight, 18 lb. cr 36

Eureka, Model G (Eureka Vacuum Cleaner Co., Detroit) $44.75 ($40.89). About average in dirt-removing ability in 1936 test. Some potential shock hazard. Cleaner was above average in amount of noise produced. It was not equipped with indicator to permit resetting to the correct height for a given rug or floor, but was provided with a detachable gauge to show height of nozzle above rug or floor. In the endurance test, the belt driving the brush was worn out after 400 hrs of operation. Mechanical looseness of parts necessitated tightening at end of test. Weight, 15 lb. (Latest model has the number "G-2" and is believed to be the same as Model G.) cr 36.

C. Not Recommended

Hoover, Model 300 (The Hoover Co., North Canton, Ohio) $49.75. Claimed by maker to be "Not a junior model. Not a skimped standard cleaner. A genuine, full-size, precision-made Hoover Electric Cleaner ... every essential Hoover feature." Ranked high in dirt-removing ability in the 1936 test. Some shock hazard indicated. This cleaner was slightly above average in the amount of noise it produced. The upper bearing of this cleaner ran hot and squeaked after 300 hrs of the endurance test. As there were no direct provisions for oiling this bearing, it was found necessary to remove the bearing housing for this purpose. The statement "Ball bearing equipped motor," on the card accompanying this cleaner, gave the impression that the main bearings at least would be of the ball-bearing type, whereas the upper bearing which failed was of the plain sleeve type. In endurance test, the commutator-brush was worn out after 450 hrs and commutator was worn at end of test. Commutator-brush arrangement made replacement of such brushes difficult. Weight, 16 lb. cr 36

Corrections and Emendations to:

Consumers' Research Bulletin

issue of March 1937

Page 19 Fertilizers and Soil Amendments: On the basis of later data *Hyper Humus* is rated *B. Intermediate*. Will be a relatively expensive material for its purpose, however, especially in localities far removed from the source of supply.

Consumers' Research Bulletin

issue of February 1938

Page 25 High-Fidelity Radio At Low Cost, Fig. 1: It is desirable (though not necessary) to have the plate current of the two 6A5G tubes balanced in the circuit diagram given in Fig. 1. To do this it will be necessary to supply the filament of one 6A5G by means of a separate filament transformer or separate transformer winding. (This expedient is necessary because the cathode of the 6A5G is connected internally to its filament. Preliminary information available at the time of issuance of the above *Bulletin* did not indicate such connection inside the then new tube.) A suitable extra filament transformer may be obtained from Wholesale Radio Service Co., Inc., 100 Sixth Ave., New York City, (Cat. No. K5495) for 89c. Neither the center tap of this transformer, nor that of the main power-transformer filament winding supplying the other output tube, should be grounded, of course.

SUMMER GASOLINES

THIS REPORT ON GASOLINE has been confined to non-leaded regular and non-leaded third-grade gasolines, as CR cannot and will not rate any product *A* whose use presents an unnecessary hazard to the consumer. Thus, no leaded gasolines were included, as it appeared, considering CR's limited funds, to be a partial waste of time and money to test and rate such gasolines when the highest rating they could possibly receive would be a *B. Intermediate*, irrespective of their other qualities or characteristics. There are important objections to leaded gasoline which have already been discussed by Consumers' Research; these it is impossible to repeat here for lack of space, but interested readers will find important information in *General Bulletins* of October 1933, January 1934, and April 1936 (25 cents each), and in confidential *Bulletins* of January 1932 (10 cents), and March 1935 (20 cents), and in confidential *Handbook* of July 1933 (35 cents). A little information on other undesirable properties (of which CR has long been aware from unofficial sources) has begun to appear in the technical press. It is indicated, for instance, that in the combustion of leaded fuels, lead salts are deposited in the crankcase oil. Associated with this is an obvious tendency to favor the formation of emulsion or sludge when water is present (as it commonly is in winter driving, and particularly when the car makes frequent stops and starts). Sludge formation is detrimental to the engine, and under particularly unfavorable conditions, the emulsifying or sludging of the oil may cause serious engine damage, or even failure of bearings. Also, the coarser particles of these lead salts settle out of the oil and increase the amount of dirt or mud formation in the crankcase.

For the benefit of those subscribers who are not familiar with CR's *Special Bulletin 26—A Consumers' Study of Automobile Gasolines and Lubricating Oils* (25 cents), or with CR's previous reports on gasoline, and in order that the ratings which follow and the comments made in connection with them may be intelligently understood, necessarily brief explanations of the characteristics upon which the ratings are based are here given.

Antiknock Quality. The lower limit of antiknock quality to which the majority of cars can now be adjusted is to a gasoline having an octane number of 60. In the tests reported in this *Bulletin*, gasolines were found to have octane numbers lying between 50 and 76. In the following ratings, any gasoline which is rated below "fair" in antiknock quality is considered a grade below what should ordinarily be used, at least in recent models of cars. In both older cars and trucks, it is usually possible to utilize a third-grade gasoline even of the poorer grades, the use of which in the most modern cars might be associated with some difficulties, particularly "pinging."

Acceleration. For a given temperature, the most volatile gasoline, that is, the one which can be vaporized most rapidly, will have the best effect in permitting rapid acceleration of the engine.

Ease of Starting and Tendency to Vapor Lock. Both of these properties depend on the volatility of the gasoline in such a manner that gasoline which starts readily also tends most readily to produce vapor lock. The tendency to vapor lock is a fairly common difficulty in the summer, but tends to give little trouble in cool climates or on cool days. Its occurrence depends upon the volatility of the gas and also to a great extent upon the design and lay-out of the fuel system. It is manifested as a difficult starting, balking, or stopping of the engine due to clogging or blocking of the fuel line with bubbles of gasoline vapor which have emerged from the liquid during its flow to the carburetor.

Sulphur Content. Sulphur compounds in gasoline are undesirable if present in amounts greater than 0.1 percent, as a relatively high sulphur content will be likely to favor the presence in the crankcase of sulphurous and sulphuric acids which are corrosive and can cause considerable damage to the engine. This is especially true of modern cars which, for the sake of permitting the use of methanol (wood alcohol) as an antifreeze, have motors and cooling systems which run much too cool for best economy and best life of the motor. Nine of the samples out of fifty-four in CR's present test exceeded the limit of 0.1 percent sulphur content. One sample contained almost three and one-half times the permissible amount.

It is advisable to select the type of fuel best suited for your car, have the proper spark adjustment made, and either continue to use that fuel exclusively (unless it is found that for some reason its quality has been lowered), or use another suitable fuel of approximately the same octane number. Actually, there is little difference in the power actually delivered when different fuels of different antiknock qualities are used, *providing the proper spark adjustment is made in each case*, and the difference in performance is only a small fraction of the difference in cost between the better non-leaded fuels and the premium leaded fuels. (It is true that the adjustment of the spark is much more difficult under present conditions, now that the simple lever control of spark advance which was formerly located on the steering wheel has been taken off and hidden under the hood where only a serviceman knows how to deal with it.) In the light of the above considerations, it will be best, with rare and relatively unimportant exceptions, to use unleaded gasoline.

Considerable difficulty was experienced in purchasing samples in time for this test to be reported in the June *Bulletin*, because of the delay in the appearance of summer gasolines on the market; but our sincere thanks are due to a number of our subscribers in various sections of the country who cooperated splendidly in purchasing and shipping samples of gasoline to us for test.

The regions where the samples were purchased are indicated in parentheses immediately after the brand names, i.e., (PC) sample bought on the Pacific Coast; (MW) sample bought in the Middle

West; (E) sample bought in the East; (S) sample bought in the South.

The ratings following have been computed on the basis of the major gasoline performance characteristics as judged by experts specially qualified in determining gasoline quality from laboratory and field test data. In order to save space, in consideration of the relatively large number of samples listed, names of the distributors in most cases have been omitted as non-essential. Where a characteristic was found to be of about average value or satisfactory, mention of that characteristic has also been omitted for a similar reason; accordingly, no weight is to be given in reading the listings to the fact that, in some cases, comments appear longer and more detailed than in others.

At the request of many subscribers, we have this year included the octane number in parentheses in the listings. This was determined according to American Society for Testing Materials Tentative Standard D-357-37T, Cooperative Fuel Research Committee method. Gasolines having an octane number of 70 or higher are considered superior in antiknock quality and, therefore, more than ordinarily serviceable in this respect for cars requiring high-octane fuel. Samples reported are third structure gasolines unless otherwise noted. All ratings are cr 38.

A. Recommended

Atlantic Capitol (E). Antiknock quality fully satisfactory (66). Below average in ease of starting.

Cities Service Regular (E). Antiknock quality fully satisfactory (65).

Gulf Traffic (E). Antiknock quality fully satisfactory (67.5).

Signal Regular (PC). Antiknock quality superior (70).

Sinclair U. S. Motor Specification (S). Antiknock quality fair (60); but note *C* rating of Midwest sample.

Stanolin (MW). Antiknock quality fair (61). Below average in ease of starting.

Super Shell Regular (S). Antiknock quality superior (70). Below average in ease of starting; but note *C* rating of Midwest sample.

Super Shell Regular (E). Antiknock quality superior (70). Better than average in ease of starting; but note *C* rating of Midwest sample. Sulphur content slightly high.

Tidex (E). Antiknock quality satisfactory (64).

B. Intermediate

Acto (S). (Standard Oil Co.) Antiknock quality fair (60). Better than average in ease of starting.

American Orange Regular (E). Antiknock quality superior (70). Better than average in ease of starting. Tendency to vapor lock greater than average.

Amoco Regular (E). Antiknock quality superior (76). Better than average in ease of starting. Tendency to vapor lock greater than average. Sulphur content slightly high.

Associated White Gold (PC). Antiknock quality fair (61). Below average in acceleration. Tendency to crankcase dilution greater than average. Sulphur content slightly high.

Billups (S). Antiknock quality fair (59.5). Better than average in ease of starting. Tendency to vapor lock greater than average.

B. Intermediate (contd.)

Champion (S). Antiknock quality fair (59.5). Somewhat below average in ease of starting.

Gilmore Blue Green (PC). Antiknock quality fair (60). Below average in acceleration. Tendency to crankcase dilution greater than average.

Gulf Coast Anti-Knock (S). Antiknock quality fully satisfactory (68). Below average in acceleration.

Hancock (PC). Antiknock quality fairly satisfactory (69). Below average in acceleration. Tendency to crankcase dilution greater than average.

Mohawk "75" Regular (PC). Antiknock quality superior (70). Below average in ease of starting and acceleration.

Navy Regular (PC). Antiknock quality superior (72). Better than average in ease of starting. Below average in acceleration. Tendency to crankcase dilution greater than average.

Norwalk Regular (PC). Antiknock quality superior (72). Better than average in ease of starting. Below average in acceleration. Tendency to crankcase dilution greater than average.

Norwalk Red Wings Regular (PC). Antiknock quality superior (71.5). Better than average in ease of starting. Below average in acceleration. Tendency to crankcase dilution greater than average.

Richfield Flash (PC). Antiknock quality satisfactory (63). Tendency to crankcase dilution greater than average.

Rio Grande G Gas (PC). Antiknock quality satisfactory (63). Tendency to crankcase dilution greater than average.

Salcedo (S). Antiknock quality fair (60). Somewhat below average in ease of starting.

Shell Green Streak (PC). Antiknock quality fair (60). Tendency to crankcase dilution greater than average.

Signal Peerless (PC). Antiknock quality satisfactory (63). Tendency to crankcase dilution greater than average.

Sinclair Green (E). Antiknock quality fair (61). Better than average in ease of starting. Tendency to vapor lock greater than average.

Sunland (PC). Antiknock quality satisfactory (63). Below average in ease of starting and acceleration.

Texaco Indian (E). Antiknock quality satisfactory (64). Below average in ease of starting and acceleration.

Texaco Indian (PC) (S). Antiknock quality fair (60). Below average in ease of starting and acceleration. Tendency to crankcase dilution greater than average.

Union White Magic (PC). Antiknock quality fair (60).

C. Not Recommended

Blue Sunoco Regular (E). Antiknock quality superior (70). Better than average in ease of starting. Tendency to vapor lock considerable. Gum content much above average. It is worthy of note that until this year eastern samples of *Blue Sunoco* have been consistently good in quality.

Caminol Beacon (PC). Antiknock quality fair (62). Below average in acceleration. Tendency to crankcase dilution greater than average.

Deep Rock (MW). Antiknock quality very low (50). Below average in ease of starting. Gum content much above average.

El Tejon Regular (PC). Antiknock quality superior (70). Better than average in ease of starting. Below average in acceleration. Tendency to vapor lock and crankcase dilution greater than average.

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Super Shell Regular (S). Antiknock quality superior (70). Below average in ease of starting; but note *C* rating of Midwest sample.

Super Shell Regular (E). Antiknock quality superior (70). Better than average in ease of starting; but note *C* rating of Midwest sample. Sulphur content slightly high.

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Amoco Regular (E). Antiknock quality superior (76). Better than average in ease of starting. Tendency to vapor lock greater than average. Sulphur content slightly high.

Associated White Gold (PC). Antiknock quality fair (61). Below average in acceleration. Tendency to crankcase dilution greater than average. Sulphur content slightly high.

Billups (S). Antiknock quality fair (59.5). Better than average in ease of starting. Tendency to vapor lock greater than average.

B. Intermediate (contd.)

Champion (S). Antiknock quality fair (59.5). Somewhat below average in ease of starting.

Gilmore Blue Green (PC). Antiknock quality fair (60). Below average in acceleration. Tendency to crankcase dilution greater than average.

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Hancock (PC). Antiknock quality fairly satisfactory (69). Below average in acceleration. Tendency to crankcase dilution greater than average.

Mohawk "75" Regular (PC). Antiknock quality superior (70). Below average in ease of starting and acceleration.

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Richfield Flash (PC). Antiknock quality satisfactory (63). Tendency to crankcase dilution greater than average.

Rio Grande G Gas (PC). Antiknock quality satisfactory (63). Tendency to crankcase dilution greater than average.

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Shell Green Streak (PC). Antiknock quality fair (60). Tendency to crankcase dilution greater than average.

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Sunland (PC). Antiknock quality satisfactory (63). Below average in ease of starting and acceleration.

Texaco Indian (E). Antiknock quality satisfactory (64). Below average in ease of starting and acceleration.

Texaco Indian (PC) (S). Antiknock quality fair (60). Below average in ease of starting and acceleration. Tendency to crankcase dilution greater than average.

Union White Magic (PC). Antiknock quality fair (60).

C. Not Recommended

Blue Sunoco Regular (E). Antiknock quality superior (70). Better than average in ease of starting. Tendency to vapor lock considerable. Gum content much above average. It is worthy of note that until this year eastern samples of *Blue Sunoco* have been consistently good in quality.

Caminol Beacon (PC). Antiknock quality fair (62). Below average in acceleration. Tendency to crankcase dilution greater than average.

Deep Rock (MW). Antiknock quality very low (50). Below average in ease of starting. Gum content much above average.

El Tejon Regular (PC). Antiknock quality superior (70). Better than average in ease of starting. Below average in acceleration. Tendency to vapor lock and crankcase dilution greater than average.

C. Not Recommended (contd.)

General Metro (PC). Antiknock quality fair (60). Below average in acceleration. Tendency to crankcase dilution greater than average.

Metro (MW). Antiknock quality too low (55.5). Better than average in ease of starting.

Mohawk Golden Arrow Regular (PC). Antiknock quality fully satisfactory (69.5). Better than average in ease of starting. Below average in acceleration. Tendency to vapor lock considerable and to crankcase dilution greater than average. Sulphur content high.

Petrol Anti-Knock (PC). Antiknock quality superior (70). Better than average in ease of starting. Below average in acceleration. Tendency to vapor lock considerable and to crankcase dilution greater than average.

Phillips' Unique (MW). Antiknock quality very low (50.5). Tendency to crankcase dilution greater than average.

Power (MW) (Mid-Continent Petroleum Corp.) Antiknock quality very low (51.5). Below average in ease of starting. Tendency to crankcase dilution greater than average.

Seaside Grade (PC). Antiknock quality fair (60). Better than average in ease of starting. Below average in acceleration. Tendency to crankcase dilution greater than average. Sulphur content slightly high.

Sinclair U. S. Motor Specification (MW). Antiknock quality very low (56). Better than average in ease of starting.

C. Not Recommended (contd.)

Spur (S). Antiknock quality fully satisfactory (69). Better than average in ease of starting. Tendency to vapor lock considerable.

Standard Flight (PC). Antiknock quality fair (60). Better than average in ease of starting. Below average in acceleration. Tendency to crankcase dilution greater than average.

Super Shell Regular (MW). Antiknock quality superior (70). Better than average in ease of starting. Tendency to vapor lock considerable. Sulphur content slightly high.

Texaco Indian (MW). Antiknock quality too low (56.5). Below average in ease of starting. Gum content above average.

U. S. Motor Specification (S) (Pan American Petroleum Corp.) Antiknock quality low (57). Below average in ease of starting.

Wilshire Economy (PC). Antiknock quality fully satisfactory (68). Below average in ease of starting and acceleration. Tendency to crankcase dilution greater than average. Gum content above average. Sulphur content high.

Wilshire Hi-Octane Regular (PC). Antiknock quality superior (70). Better than average in ease of starting. Sulphur content high.

Wilshire Polly Gas Regular (PC). Antiknock quality superior (71). Sulphur content high.

Xcel (MW) (Pure Oil Products Co.) Antiknock quality very low (52). Better than average in ease of starting.

AUTOMOBILE OILS—SUMMER GRADES

THE FOLLOWING OILS have been rated on their degree of change in viscosity with changes in temperature. It is now generally accepted that, from the consumer's point of view, present-day oils of well-known brands are of such quality that the change in viscosity ("thickness") with temperature is the only important distinguishing characteristic. Oils rated *A* are therefore notably superior in this respect; those rated *A* but below the row of asterisks, very good; those rated *B*, about average; and those rated *C*, poor or very poor. Oils which were not of the viscosity claimed were penalized for the error made in their representation to the consumer. *Sunoco* and *Greenspot*, however, would have received a *C* rating without regard to their claimed viscosity.

Samples were purchased in various sections of the country in a similar manner to the gasolines, the brands being chosen on the basis of a study of brands sold regionally, made by CR subscribers who volunteered to help in this way for their several localities. All were purchased as S.A.E. 30 and in the majority of cases were canned oils; the sole exception is noted in listings. Prices given are per quart and include taxes where such are in force. All ratings are cr 38.

A. Recommended

Esso Uniflo No. 3 (E) (Standard Oil Co. of Pa., N.J., and La.) 35c. **AA3**

A-penn (E) (A-penn Oil Co., Butler, Pa.) 16.1c. 2-gal can, $1.29. **1**

Pittroil (S) (Distrib. Southern department stores) 17.4c. 2-gal can, $1.39. **1**

Sears Penn Medal (E), Cat. No. 28—4503 (Distrib. Sears, Roebuck & Co.) 16.6c including postage (Parcel Post, zone 2). 10-qt can, $1.39 plus postage. **1**

Wards Standard Quality (E), Cat. No. 461—7392 (Distrib. Montgomery Ward & Co.) 17c including postage. 5-qt can, 69c plus postage (zone 2). **1**

Essolube (S) (E) (Standard Oil Co. of Pa., N.J., and La.) Southern sample, 28c. Eastern, 25c. **2**

Golden Shell (E) (S) (MW) (Shell Oil Co.) Southern sample, 28c. East and Midwest, 25c. Statement on can, "It is the oil specially made for today's stop-and-go driving. And so it can keep an engine 'young' a year longer," is to the technician meaningless and to the layman misleading. (Note *C* rating of sample purchased in Pacific Coast region.) **2**

A. Recommended (contd.)

Gulflube (S) (Gulf Oil Corp.) 28c. 2
Lion Head (PC) (Gilmore Oil Co.) 26c. 2
Lubrite (MW) (Socony Vacuum Oil Co., Inc.) 26c. 2
RPM (PC) (Standard Oil Co. of Calif.) 25c. 2
Havoline (S) (Indian Refining Co.) 35c. 3
Mobiloil (S) (Socony Vacuum Oil Co., Inc.) 35c. 3
Quaker State (S) (Quaker State Oil Refining Corp.) 40c. 3
Triton (PC) (Union Oil Co. of Calif.) 30c. 3
Veedol (PC) (Tide Water Associated Oil Co.) 30c. 3

* * *

The following oils are also *A. Recommended* but are not quite as satisfactory as the oils already listed.

Amoco (E) (American Oil Co.) 25c. 2
Cities Service (E) (Crew Levick Co., Philadelphia) 25c. 2
Faultless (MW) (Mid-Continent Petroleum Corp.) 26c. 2
Motorine (MW) (Continental Oil Co.) 26c. 2
New Texaco (E) (PC) (MW) (S) (The Texas Co.) 25c. Southern sample, 30c. 2
Opaline (MW) (E) (S) (Sinclair Refining Co., Inc.) 25c. Southern sample, 30c. 2
Purol (MW) (The Pure Oil Co.) 27c. 2
Trop-Artic (MW) (Phillips Petroleum Co.) 25c. 2
Tydol (E) (Tide Water Associated Oil Co.) 25c. 2

B. Intermediate

Spur (S) (Chalmette Petroleum Corp.) 20c. Mis-branded; actually S.A.E. 40. 1
Zerolene No. 5 (PC) (Standard Oil Co. of Calif.) 15c. 1
Atlantic Quality (E) (The Atlantic Refining Co.) 25c. Misbranded; actually S.A.E. 40. 2
Champion (S) (Jackson Oil Co., Inc.) 25c. 2
Motoreze (PC) (Union Oil Co.) 25c. 2
Iso-Vis "D" (MW) (Standard Oil Co.) 31c. Misbranded; actually S.A.E. 40. 3
Panoco (S) (Pan American Petroleum Corp.) 30c. 3

C. Not Recommended

Greenspot (PC) (General Petroleum Corp. of Calif.) 15c. Misbranded; actually S.A.E. 40. 1
Long-Run (PC) (Western Auto Supply Co.) 12c. Bought from bulk stock. 1
Gold Crest (E), Cat. No. 28—4476 (Distrib. Sears, Roebuck & Co.) 11.6c including postage. 10-qt can, 89c plus postage. 1
Wards Commander (E), Cat. No. 461—7349 (Distrib. Montgomery Ward & Co.) 12.3c including postage. 2-gal can, 66c plus postage. 1
Cycol (PC) (Tide Water Associated Oil Co.) 25c. 2
Golden Shell (PC) (Shell Oil Co.) 25c. 2
Richlube (PC) (Richfield Oil Co.) 25c. 2
Star (S) (Rose Oil Co.) 25c. 2
Sunoco (E) (Sun Oil Co.) 25c. Misbranded; actually S.A.E. 40. 2

CONFUSING THE RADIO CONSUMER

A leading radio trade journal recently printed the following letter from a radio distributor:

"American radios are becoming more and more alike and it appears that one can buy at least 12 makes of radios which are identical in every detail, except for the name.

"This naturally upsets us to a very large extent, inasmuch as we cannot quote our 8-tube models at a fair retail price when a "retail-wholesaler" quotes the same receiver with a different name at a much lower price.

"If only you could impress on some manufacturers the importance of different cabinets and dials, even where chassis must be the same, it would assist all dealers operating under the conditions we are."

Subscribers may recall that in January 1936, CR drew attention to the practice of Cooperative Distributors in selling radios identical to those sold by a mail-order radio retailer, but under a different brand name, at prices representing a markup of about 25 percent to non-members, 16 percent to members of Cooperative Distributors. The idea did not originate with Cooperative Distributors; it was an old device of capitalist merchandising which cooperatives find so objectionable when not employing it for their own advantage.

The consumer will be amused, perhaps, to note the frankness with which the retailer, quoted above, expresses his chagrin at the failure of the consumer to be deceived by radio sets with different nameplates but identical construction. Were anyone to ask this dealer how he could justify, in an ethical sense, the charge of an extra price merely because the consumer did not recognize the identity of the higher-priced and the lower-priced set, he would no doubt have more than a little trouble explaining his position.

If manufacturers and merchants would more often look at problems from the standpoint of their customers as consumers, they would not so often give evidence of a deep underlying anti-consumer motivation which pervades certain parts of the distribution industries. A dealer who is really functioning as a purchasing agent for the consumer, as dealers' associations commonly insist they are, would make common cause with the consumer and determine *not* to differentiate sets that are actually identical, and would resent any action or practice of the manufacturer which would tend to deceive either dealers or their customers.